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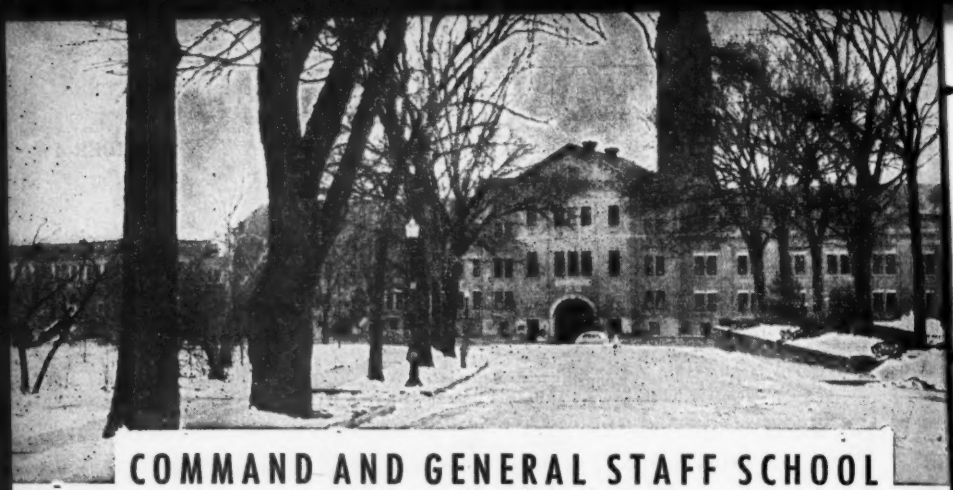

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The Future of the Army Air Forces

GENERAL CARL SPAATZ
Commanding General, Army Air Forces

THROUGHOUT World War II, the Army Air Forces faced an inherently difficult and complex task. Its primary goal always was to assemble, organize, train, equip, transport, and maintain in far distant theaters of action Air Forces strong enough to apply the American doctrine of military air power against powerful and well prepared opponents. The grim exigencies of war constantly interfered with the delayed attainment of that primary goal. Necessity dictated that air units be committed to battle in piecemeal fashion almost as soon as they arrived in the theaters. The losses in men and matériel which naturally accompanied such commitments resulted in considerable dissipation of strength. The necessity for sharing American production and training facilities with the Allies further complicated and delayed the task of building up Air Forces in the theaters strong enough to execute properly the tactical and strategical responsibilities of the Air Forces.

The mission of the Army Air Forces in peacetime is to develop and to maintain a military air force capable of immediate, sustained, and expanding application of the accepted doctrine of military air power. It must cooperate fully and be geared to work in close harmony with the nation's ground and naval services in discharging the joint responsibility for supporting American foreign policy and for maintaining the peace. The Army Air Forces can accomplish its mission only if it maintains an Air-Force-in-Being of adequate size and proper composition.

Air Reserve and Air National Guard

The Air Reserve and the Air National Guard will form an integral part of the air defense structure of the United States. The mission of the Air National Guard is to provide a reserve component of the Air Force, capable of rapid expansion to war strength. The Air Reserve will provide, in an emergency, additional trained officers and men for replacements in and for expansion of the Air Force, as well as units organized and trained in time of peace for rapid mobilization, expansion, and deployment in time of war. These Reserve units will be of the type and numbers which will best supplement the regular Air Forces and the Air National Guard to round out a balanced Air Force.

Deployment

The deployment of air combat units must be consistent with the concept that the Air Forces must be prepared to meet, at points well beyond the continental limits of the United States, any attack aimed at the national security. The consequent disposition of the Air Forces necessitates bases on which, as circumstances demand, offensive force can be poised well within reach of the war potential of any possible enemy. The number of units held on overseas bases will be kept to the minimum in order to prevent dissipation of strength. A strong air striking force must be readily available for rapid concentration and employment. While a certain number of combat groups may have their primary stations in advanced strategic areas, a program of rotation will insure the presence of a strong, mobile air striking force in continental United States. The units based in the United States will serve to meet tactical requirements and will form the bulk of a mobile striking force quickly available to reinforce and to complement units in forward areas.

Organization

The Army Air Forces must contain a number of components within that fundamental unity which characterizes its singleness of design and purpose for the fulfillment of its mission. In the new organization, there will be three major combat commands and five supporting commands operating under Headquarters, Army Air Forces. No more than eight individuals will report directly to the Commanding General, thereby insuring simplicity of structure. The three combat com-

mands will be: (1) the Strategic Air Command, which will embody the combat groups of the long range striking forces; (2) the Air Defense Command, which will be responsible for the air defense of the continental United States and for the coordination of the continental air units, including the Air National Guard and Air Reserve, into effective fighting forces; and (3) the Tactical Air Command, which will be charged with cooperative missions with the surface forces. Immediately under these commands will be the numbered Air Forces.

In addition to the three combat commands, there will be (1) the Air Matériel Command, which will perform normal maintenance and supply functions as well as research and development; (2) the Training Command, which will provide all phases of individual training except the higher education carried on in the Air University and the unit training conducted in the three combat commands; (3) the Air Transport Command, which will provide the global systems, including military air transport, air signal communications, flight service, weather, rescue, flying safety, and aeronautical chart service; and, finally, (4) and (5) the Air University and the Air Force Proving Ground Command, two agencies whose functions will be to crystallize and to disseminate the latest Air Force doctrine through training programs and through tactical experimentation.

The Commanding General of the Army Air Forces ordinarily will exercise only administrative, training, and tactical supervision over the air units assigned to a theater. Under certain conditions of employment of units of the Strategic Air Command, however, his function may be extended to the exercise of complete command control, as was the case originally with the Twentieth Air Force. The objective of the Army Air Forces organization is, in the final analysis, to form the most effective military machine possible.

Cooperation with the Surface Forces

World War II clearly and conclusively demonstrated the fundamental soundness of the American conception of the function and potentialities of strategic air offense. The atomic bomb has provided a weapon which tremendously increases the effectiveness of air power. From this it follows that any future conflict will begin with air action, and may well be concluded by it; but, despite this possibility, the Air Forces must be able to participate with the surface forces in coordinated action. The Air Forces must fulfill its role in these joint tasks with the same high degree of efficiency which characterizes its ability to accomplish a purely strategic air mission. To this end, the Tactical Air Command will be equipped and trained to perform joint air-surface training and field exercises with the surface forces, to perform demonstrations at service schools, to carry out tests of new procedures of joint air-surface operations, and to develop techniques of tactical air operation.

Scientific Research

The advance of air power depends peculiarly on scientific progress. Research must be continued in order to derive from new scientific developments their military application. Recognition of the commanding importance of science is indicated by the designation of a Deputy Chief of Air Staff whose sole duty will be to guide and control a program of research and development, and to maintain close liaison with government research agencies. To further the education of technical personnel, selected young officers must be given the opportunity to take advanced technological courses, at both military and civilian institutions. There must be no stinting of expenditures in the field of research and scientific development. Military doctrines must be continually altered to conform to and to take full advantage of scientific discoveries and developments.

Industrial Planning

To insure a maximum production of weapons in a minimum of time, production to meet any contingency must be planned in advance. This is especially true for military aircraft and related components, which cannot be stockpiled because they become obsolete

quickly in this era of rapid technical advancement.

The high operational mobility of the Air Forces must be matched always by a corresponding logistical mobility. Unless an organization attains logistical mobility, its attainment of operational mobility is nullified. Operational plans and programs will be evolved, therefore, with close reference to logistical plans and programs. Means, and techniques for the distribution of personnel and matériel must be constantly improved to attain maximum mobility.

School System

The establishment and maintenance of an educational system to assure high standards of professional education for military personnel will be a significant contribution toward the establishment of an Air Force trained and equipped to meet any eventuality. To that end, the Air Forces already has begun to formulate a complete educational system, the Air University. The Air University will function directly under the Commanding General, Army Air Forces and will be concerned with the formal schooling of all Air Force officers. The courses offered will include graded professional training in subjects above the level of those studied by the officer in the acquisition of his primary military specialty or rating.

The prototype of the Air University is the Army Air Forces School at Maxwell Field, Alabama, which will begin an Air Command and Staff Course in September 1946. A course in basic tactical training and a course in advanced strategy and logistics are planned. The Air Force Institute of Technology has been established at Wright Field, Ohio, under the Air Matériel Command. This will be integrated into the AAF School System on the Command and Staff Course level to meet the need for officers trained in technology and research. The complete Air Forces plan calls for progressive training in three main phases, each phase adjusted to the responsibility and experience level of the individual officer as he moves upward in his career.

Although the Air Forces is the youngest of the armed services, it has a tradition and a glory of its own, stemming from its heroic accomplishments in the air battles of two World Wars. Its officers and men, its component air forces, wings, groups, and squadrons, have added new bright chapters to the glorious history of mankind. From this tradition of gallantry springs the *esprit de corps* which gives powerful coherence and unity to the Air Forces. From this pride in achievement springs confidence that the Air Forces will continue to fulfill its mission with distinction.

The first lesson (from the recent war) is that you can't lose a war if you have command of the air, and you can't win a war if you haven't.

For this country that is a good thing. If successful war-making depended upon masses of men this country would be at least fourth down the list of world powers.

If it depends upon world-girdling colonies, possessions and sea bases, we should definitely have to take a secondary position. But when it depends upon technological progress, mass production and men capable of intelligent use of intricate machines, we are in a field where America can be second to none . . .

Anyone who is thinking of the defense of this country or of its vulnerability to attack has got to start with a polar projection, which shows every possible area from which an attack might come within attack distance from this country.

Lieutenant General James H. Doolittle

Life in a Japanese Prisoner of War Camp

COLONEL MICHAEL A. QUINN, *Quartermaster Corps*

As past experiences of life in Japanese prisoner of war camps merge into the distant past, one recalls an overall impression of a lack of consistency in policy toward prisoners of war. One wonders why this inconsistency. Was it because our captors had no idea of ever taking prisoners? At first we were informed that Japan did not recognize the status of prisoners of war, but considered us as captives. Certain it is that every opportunity was seized to humiliate us, to make us "lose face." When we arrived at Karenko, Formosa, we were stripped to the skin for a search, and Japanese officers and soldiers took moving and still pictures of our ludicrous appearance. Having no status to be respected, regardless of rank, every Japanese soldier was given to understand that we were not only subordinate, but inferior. It is my belief that the Japanese High Command encouraged this attitude amongst the soldiers to break down the inferiority complex of the Japanese in the presence of the White races. At any rate we were given to understand that we had no rights whatever and were allowed to live only because of the kindness of the emperor.

At the O'Donnell POW camp in the Philippine islands the general officers and full colonels were separated from the other officers and taken to a camp at Tarlac. Orderlies at the rate of one per general officer and one per two colonels accompanied us. (We later found that "orderlies" were simply additional workers taken to prison camp, not for the prisoner's benefit, but for the Japanese—performing all menial tasks for them.) At Karenko all general officers and high ranking civilian officials, such as the governors general of Netherland East Indies, Hong Kong, and Singapore were taken to an adjacent camp. Later all were returned to Karenko except about sixteen who were the senior army officers of the American, British and Dutch forces, and the civil officials. General Wainwright was in the latter group. We rejoined them and had the pleasure of being with them for a few weeks at Chang Chia Tun in Manchuria in November 1944.

The administration and policies varied in detail in each camp. Policies were inaugurated and enforced at the whim, not only of the camp commander, but of any Japanese soldier. As a whole our treatment was better when we were under Japanese soldiers than under members of the Taiwan army. While on Formosa, officers were abused physically, forced to manual labor and constantly harassed by sentries. In Manchuria, we had only Japanese soldiers who bothered us comparatively little, struck no officer that I recall, and forced us to no manual labor.

All in all we were confined in six prison camps (seven, if we count two weeks in a fourth rate Japanese hotel in Beppu, Japan proper). To list each camp separately would be rather boring, so let us take the setup of Shira Kawa, Formosa, as indicative of the prisoner of war camp organization and operation by the Japanese.

All POW camps on Formosa were under the command of a Japanese colonel or lieutenant colonel, who bore the title of Senior Camp Commandant. To whom he reported directly we never knew, but a Prisoner of War Information Bureau in Tokyo seemed to deal quite directly with him and camp commanders. We received visits from him periodically, and were usually treated to a speech in which he told us how good he was to us.

The camp commander was a captain or a lieutenant, usually the latter. He was charged with the usual duties of commanding officer, but with far more power in disciplinary action than would be given an American officer. If we may believe threats, he had authority to order the execution of any prisoner. We have reason to believe that his authority was used in at least two instances at Camp O'Donnell in the Philippines. The camp commander usually had two other officers on duty; a sergeant major, several other noncommissioned officers and a detail of pri-

vates. The quartermaster was a civilian in a semi-military status. At every camp there was at least one interpreter. At Shira Kawa he was an American-born Japanese who had attended an American college in San Francisco, California.

The enlisted detachment mentioned above guarded the prisoners while at work, and acted as overseers on all projects. In addition, Interior Guards, furnished by adjacent military camps and changed monthly, were posted about the compound and patrolled the barracks from time to time. Just what their relationship to the permanent party was, we never knew. Our enlisted men who were more intimate with the Japanese soldiers than we were, have told us that the Interior Guard reported to their commanding officer instead of to the local commander. There are several instances of orders of the sergeant of the interior guard being overruled by a private of the permanent party, particularly in the treatment of prisoners in the guard house.

The compound at Shira Kawa was an irregularly shaped square about four acres in area (the size of the enclosure was the subject of much debate in the prisoners' barracks). The yard was surrounded by a bamboo fence ten feet high with barbed wire entanglements three meters wide on the inside. The fence was pierced by four gates. Within the compound were four long barracks (single story) each approximately 140 feet long running generally north and south and an enlisted men's barracks, a former stable, at right angles to the officers' barracks. A four foot hall ran through the center of the building separating the rooms which were eighteen feet square giving the building a width of forty feet. In one of the corners of the compound was the guard house. Latrines were adjacent to the barracks. The northeast end of the compound included the store house, kitchen and bath room, and hospital. The plumbing of these buildings consisted of trenches which drained into a larger drainage ditch running throughout the camp. This ditch also carried off the excess rain water to a creek running outside the fence.

Outside the compound were the barracks of the garrison, the shoe room and tool room and headquarters building for the camp. (All prisoners were required to place shoes in "pigeon holes" in the shoe room. No footwear with counters was allowed in barracks.) The prisoners cleared the brush and undergrowth from a hill about two acres in area with a fence about seven feet high. This area was known as "Yasume Park" and was to be used as a recreation ground by the prisoners. (Yasume is the Japanese word for rest.)

For the organization of the prisoners an attempt was made to separate officers by national groups, although there might be mixed groups under one roof. The groups were subdivided into "squads" of about forty officers with squad leaders appointed by the Japanese. The size of the rooms varied but most rooms held eight officers. Room leaders and other administrative personnel jobs were allotted by roster within the rooms. All police work in the officers' barracks and police work outside was done by officers. Bunks made of bamboo with ladder-like beds were issued to all officers. Bedding consisted of bed sacks, four heavy felt and two light cotton blankets, one sheet and a pillow, the latter a sack, twelve inches long and six to eight inches in diameter, filled with rice husks. As Shira Kawa is in malarial country all were required to sleep under mosquito bars. If we did not possess individual bars, one was issued to cover four beds. As stated before, the rooms were about eighteen feet square. Two tables with four benches were placed in the center of each room. One 15-watt light bulb furnished our artificial light.

Because of the frequency and the intensity of earthquakes all barracks were frame and during quakes weaved from side to side, but nothing ever gave way.

The Japanese appointed prisoners of war to camp duties as follows: Administrative Officer and his assistants, Camp Commodities Officer, Canteen Officer and assistants, Librarians and hospital staff. All these were excused from labor and received additional food for work in the administrative setup. Routine details and instructions to prisoners

were routed from headquarters, through the interpreter to the Administrator, squad leader and to the prisoners. This group took care of all details such as work details, issuance of tools, care of shoes, etc.

The Camp Commodities Officer was, to intent and purpose, the local supply officer. Each squad and room had its own commodities officer.

The post exchange was operated by three officers and one enlisted man who received such supplies as came in and issued them to squads on the basis of numerical strength. Squad and room post exchange representatives made this issue to individuals and collected for all purchases. We were authorized to draw about fifty yen per month for purchases at the post exchange. Items available were cigarettes, cigars, tea, catsup, flavoring syrups, curry powder and whatever junk a local dealer wished to unload. No stipulated quantities would be available and all items were usually prorated. In addition we were authorized to spend money from our bank accounts for dentures, spectacles, clothing, and musical instruments. Any item which was a drug on the local market would be available. Prices ranged from 1.25 yen for a bone cigarette holder to 600 yen for an accordian. (The pre-war value of the yen was about thirteen cents American.)

If we could not spend our monthly allowance, any balance remaining would be deducted from the following month's allowance so that at no time were we allowed to have more script in our possession than the allotted amount. Soldiers received only five yen per month from the Japanese and any additional money needed was given them by officers, who also paid for dental work and glasses for enlisted men.

Some of the prisoners of war were fortunate enough to have books and magazines in their possession. These, together with books furnished by the Japanese, were pooled and formed our library. The librarians were appointed by the local commander.

The messing was simplicity itself. We were issued about one-third of a canteen cup of rice three times a day with a bowl of boiled vegetables. The rice and soup were carried from the kitchen by members of the squads and food was ladled out into the individual containers or dishes of the prisoners which had been assembled in one room. At times our morning "soup" had a portion of soy bean paste called "misu" added. This, with an occasional banana, mangoe or "portion" of pineapple, was our mess allowance. Meals were prepared by enlisted men in the kitchen for awhile under the direction of Colonel Cornell, who finally gave up the job in disgust after months of effort to improve conditions. He did help it quite a bit, but any marked or permanent improvement was impossible because of the unwillingness of the Japanese to cooperate.

Our hospital was staffed by medical officers from the prisoner personnel. Colonel Robert Hoffman was on duty as go-between and interpreter for the staff and Japanese. What a licking that man took! Trying to explain to a stupid and sadistic Japanese soldiery that the hospital needed many items of medicine and equipment, that some men were physically unable to work under the prevalent conditions would have tried the patience of a saint.

The Jap in charge of the hospital was a non-com who had no medical training beyond first aid, yet physicians and surgeons had to act under his orders. Bandages were almost unknown, while adhesive tape was something to recall in a dream. Some medicines, such as quinine, iodine, aspirin, etc., were issued as carefully as diamonds. The dentist was allowed only a few picks—no drilling equipment—and the only filling he could do was with cement. That any lived through that regime was due to the untiring efforts of Colonels Gillespie and Glattly of the Medical Corps, and the patience and tact of Colonel Hoffman.

Although the Japanese had not signed the Geneva Convention, Radio Tokyo in February 1942, announced to the world that they would comply with its provisions. This acceptance was reiterated to General Wainwright about 20 March 1945, and was promised to us by Colonel Ito at Tarlac. The Geneva Conven-

tion forbids forced labor by officers and restricts the working of enlisted men, but the Japanese ignored the rights of both officers and men. Officers were required to do any and all work regardless of rank. The jobs included clearing and breaking ground for a farm, picking and cutting grass, caring for goats, rabbits, chickens, and hogs. When water was low in the reservoir we carried water for drinking and cooking as well as for Japanese soldiers to bathe in. To combat the malarial conditions at Shira Kawa we cleared creek beds and dug drainage ditches. Roads had to be built and foot bridges constructed—all by prisoners. The chief commandant decided we needed a fish pond, so prisoners built dams to impound the surface drainage and the pond was complete. Prisoners over sixty years of age were excused from work, as were those whose physical condition was such that our medical officers could convince the Japanese medical non-com of their inability to work. These recommendations were over-ridden frequently. All tools for enforced labor, and animals, such as chickens, hogs and rabbits, were purchased out of the salaries of the prisoner of war officers. Officers drew the salary of the equivalent grade in the Japanese army. A colonel drew 310 yen a month which was deposited to our credit in the Japanese Postal Savings bank.

The Japanese had an unholy fear of prisoners escaping. Where we could have gone or how, none of us could ever figure out. In addition to the guard previously mentioned a "Vigilance Guard" was established in each barracks, personnel furnished by the occupants. This guard was posted for one hour after "lights out" at night, until reveille the following morning. Each guard woke up his successor. We checked out and in everyone going to the latrine and were on the alert for fire and any disturbance or disorder. If a prisoner was in the latrine an unreasonable length of time the guard was supposed to find out why. A guard was responsible that no one escaped, or as the Japanese expressed it, "absconded." What would have happened if such an event took place, no one knew, but it certainly would have been very unpleasant.

Japanese discipline is severe and swift. A man may be beaten by a superior in the Japanese army with no apparent recourse. The brutality of the beating is at the discretion of the beater. Our officers and men were thrown into the guard house for a week for such crimes as sitting on the bed during daylight hours. One drew a week for having a knife in his possession. That knife was a silver butter spreader. Japanese noncommissioned officers and private soldiers had almost unlimited powers over the prisoners of war. They could and did beat up prisoners for any or no apparent reason. Protests were futile. Mass punishments were favored; e.g., each room was considered as a group, and all members were held individually and collectively responsible for the compliance of all orders.

Recreation was not considered very necessary or desirable by our jailers. Anything unusual that was not unpleasant was considered recreation by us. We had a few baseballs and gloves and managed to play a little catch. A half-hearted attempt was made to interest us in volley ball and basket ball, but our weakened physical condition did not allow much of that. Cards might be played on weekends and three nights a week we had "gramaphone concerts" with a lecture, making these a semi-musical appreciation course. Colonels Brawley, Sage and Lily did a great deal in arranging non-phonograph musical entertainment by forming a glee club and presenting it.

One of our biggest amusements was receiving and sending mail. Some were fortunate in the receipt of plenty of mail and packages from home. Others received little mail and about 40 per cent of us received no packages. Occasionally an opportunity was given to *submit* a radio message home, although not all were sent. Our letters home were censored to prevent our describing conditions. One English officer wrote to his family: "We may not mention friends in camp, our treatment, our weight or health. Our

food is also unmentionable." We heard the letter went through.

During our three years and four months we received twelve food packages—some broken—from the Red Cross, also such items as shoes, socks, trousers, toilet articles and other miscellaneous articles. Red Cross representatives made several inspections of the camp but their tours were so supervised by the Japanese that no benefit came of it. It is to be regretted that the representatives were not better qualified to inspect camps and publish to the world the results of their findings. The visit of the members of the representative power was equally futile.

The Japanese are credited with being a cleanly people. If what we saw while under their control is indicative of their standards of cleanliness, they are greatly overrated.

It is all over now. Out of about 22,500 taken prisoner in the Philippines, less than 5,000 have been reported alive as far as I can find out. Those of us who have survived, turn back in our minds and ask ourselves the question: "Did it really happen to me?" One thing we all learned from our prisoner of war experiences is that the greatest treasure we have is our American home.

Allied Officers in the Twenty-Seventh General Staff Class

On 11 February 1946, the Twenty-Seventh General Staff Class began at Fort Leavenworth, the second sixteen-week class, as contrasted with the ten-week war time classes.

In preceding classes, a representation of officers from other Allied countries had been found, but, in the Twenty-Seventh General Staff Class, for the first time in the history of the Command and General Staff School, nearly one out of every five student officers had come from an Allied Nation. Of the 762 student officers enrolled in the class, 145 represented fifteen Allied countries. Distributed among the three instruction groups, eighty-seven attnded the Ground Staff Course; forty-six the Air Staff Class; and the remaining twelve the Service Staff Class.

fficers from other countries have attnded classes at Fort Leavenworth since 1907, when the School was known as "The School of the Line."

Two Mexican Officers, Lieutenant José Landa and Lieutenant Luis Monter, are recorded as the first officers from Armies other than the United States Army to attend the courses at Fort Leavenworth. They graduated with the class of 1908. Two officers from Cuba, Captain Ernesto N. Fabio and Lieutenant Ramón O'Farrill, were the next foreign officers who completed the course of instruction at the school, graduating with the class of 1912.

Ten years later, in 1922, "The Command and General Staff School" was established, and Lieutenant Ramón O'Farrill of Cuba, now a Captain, was the first foreign officer to attend the school under its new, and present title, graduating with the class of 1924. Throughout the next twenty-two years, a varying number of officers from other countries attended classes at the School, but never in the magnitude of numbers aparent in the Twenty-Seventh General Staff Class.

The countries represented and teh number of officers from each in this class were as follows:

Country	*Ground and Service Staff*	*Air Staff*	*Total*	*Country*	*Ground and Service Staff*	*Air Staff*	*Total*
Bolivia	5		5	Great Britain	5	2	7
Brazil	30	10	40	Guatemala	12	1	13
Canada	2	2	4	Mexico	8	14	22
Chile		1	1	Paraguay	6		6
China		8	8	Peru		4	4
Colombia	10	2	12	Philippine	15		15
Cuba	2		2	Siam	2		2
France	2	2	4		99	46	145

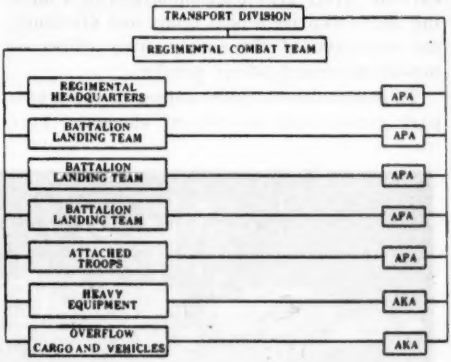
Captain Rafael Montilla, Aide to the Commandant, C&GSS

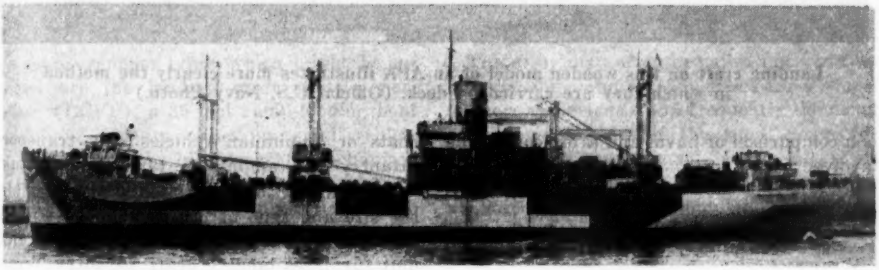
Put 'Em Across

MAJOR CLARENCE K. SANDELIN, *Transportation Corps*
Former Instructor, Command and General Staff School

OCEANIC theaters of operation dictate that personnel and matériel of assault echelons be provided water transportation to each new major objective, and require also that the endless traffic of communications zone be water borne. To meet these amphibious requirements many specialized units have been developed in all branches of the armed forces. In the continued action in the Pacific, an understanding of all hands of the nature and employment of these units assisted in the smooth integration of our joint operations.

In assault operations the naval force commander, basing his action on the estimated over-all shipping requirements, allocates naval vessels for the transport of troops and matériel. The naval transportation elements of a typical Joint Attack Force are thereupon organized into three major groups.



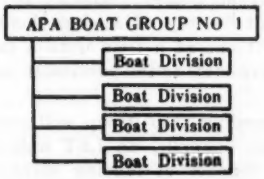


APA (Assault Transport) with landing craft on deck. (Official U.S. Navy Photo.)

A transport group is composed of one or more transport divisions. Each transport division has APAs (assault transports) and AKAs (assault cargo ships). The composition of both this group and of its component divisions may vary with the situation.

The APAs and AKAs normally carry sufficient landing craft, vehicle personnel (LCVP) and landing craft, mechanized (LCM) to land the troops embarked. Particularly valuable in unloading army vehicles, the LCM(3) is the largest landing boat normally carried aboard assault transports and cargo ships.

APA-based landing craft assigned to carry landing force assault units from ship to shore are organized into boat groups and divisions. The boat group, commanded by a naval officer, transports a battalion landing team or equivalent unit from ship to shore in one trip.



Each boat group is made up of two or more boat divisions, in each of which a tactical subdivision such as a company or platoon is carried. Army personnel embarked in a landing boat comprise a boat team, and are under the command of the senior army officer or noncommissioned officer present.

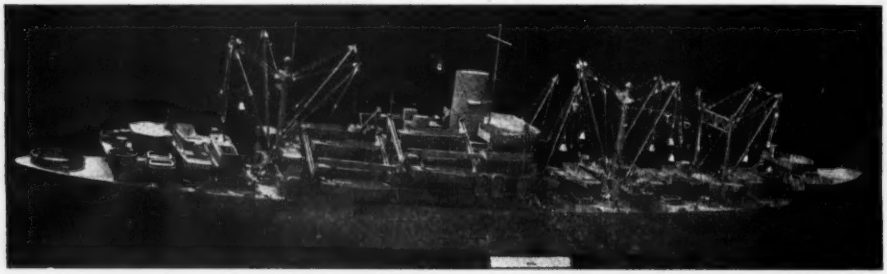
To emphasize the joint aspect of the transport group, and its related elements, here is a comparison of naval and army commands involved:

NAVAL	*ARMY*
Transport Group Commander	*Landing Force Commander*
Transport Division Commander	*RCT Commander*
Transport Commander	*CO of troops*
Boat Group Commander	*Landing Team Commander*
Wave Commander	*Senior Troop Officer*
Boat Division Commander	*Senior Troop Officer*
Boat Officer or Coxswain	*Boat Team Commander*
Beachmaster	*Shore Party Commander*

In addition to the transport group, the naval force includes a landing ship group, and a landing craft group. Because amphibious operations must adjust to specific insular conditions in approaching one isolated task after another, navy organization provides for maximum flexibility by assigning the great variety of modern landing ships and craft one at a time until a tailor-made unit is available to the particular joint attack forces.

The landing ship group will normally include, for example, an LST unit, composed of that number of landing ships, tank, required in the current operation, an LSM unit providing the requisite number of landing ships, medium and an LSD unit if landing ships, dock, are to be employed.

These landing ships (LST, LSM, LSD) are normally provided to transport amphibious vehicles, mechanized units, artillery, and other units containing heavy equipment, and supplies. Suitable types carrying landing boats or amphibian vehicles may transport infantry and amphibian tanks for assault.



Landing craft on this wooden model of an APA illustrates more clearly the method in which they are carried on deck. (Official U.S. Navy Photo.)

The landing craft group is also flexible, the size and type of craft employed will be adjusted to meet various operations. The LCI unit furnishes landing craft, infantry, large, for the transportation of personnel. Vessels of this type, however, are not normally employed to bring in personnel in the initial assault against a defended beach, although they are used sometimes in landing raiders on the flanks or intervals of beach combat areas. The more customary employment of LCI(L) is to bring reserve echelons to the beaches after effective enemy fire is diminished or dispersed, or to hold a floating reserve of troops just off the beaches ready to debark directly into areas of critical action.

The LCT unit is composed of the requisite number of landing craft, tank, to be employed in the operation at hand. The LCT, known affectionately and otherwise as the work horse of the Pacific, appears in several models. The LCT(5) is the most familiar

of these, although the LCT(6) and the LSM are later developments of the basic type.

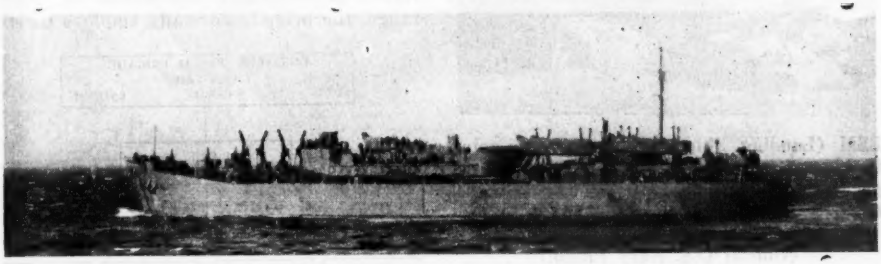
The landing craft group may include several other type units, depending upon such factors as the hydrographic situation in the objective area, the availability of APA-based landing craft, or the availability of army small boats and amphibian vehicles. Some of the more common types which might be involved are the landing craft vehicle, personnel (LCVP), a 36-foot ramp-loading boat capable of carrying either one small vehicle or 36 men, and the landing craft mechanized (LCM), a ramp-loading lighter capable of landing one medium tank or a standard cargo truck directly on the beach. The following list summarizes the more common operational types of landing craft.

VEHICLE AND TANK LANDING CRAFT

LCM(3) ---------Landing Craft, Mechanized
LCT(5) ---------Landing Craft, Tank
LCT(6) ---------Landing Craft, Tank
LCV ---------Landing Craft, Vehicle

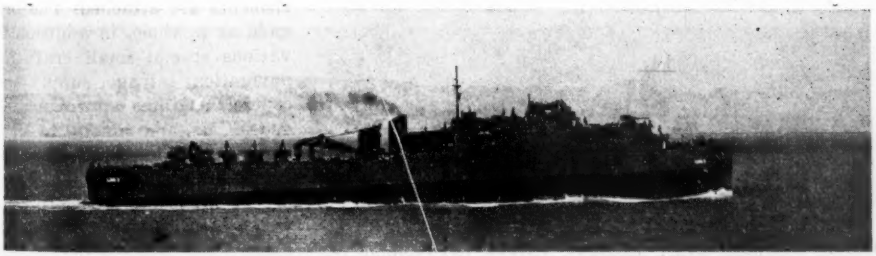
SUPPORT AND COMMAND CRAFT

LCC(1) -------Landing Craft, Control
LCC(2) -------Landing Craft, Control
LCI(G) -------Landing Craft, Infantry, Gunboat
LCS(S) (1) ------Landing Craft, Support (Small)
LCS(L) (3) ------Landing Craft, Support (Large)



LST (Landing Ship, Tank). Silhouetted on the deck of an LST is an LCT and other smaller craft. (Official U.S. Navy Photo.)

The army may often be called upon to furnish the ships and craft required for a *shore-to-shore movement*,[1] and frequently the army has provided some of the small boats for *ship-to-shore movements*.[2] Nearly all types of landing craft under 100 feet in length are available in engineer amphibian units, and although the navy furnishes the bulk of this



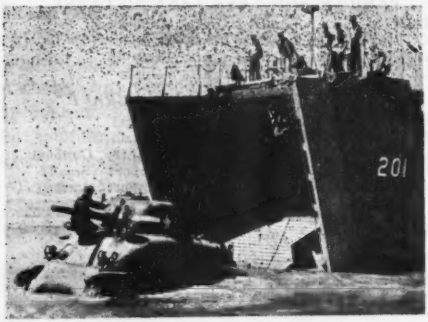
LSD (Landing Ship, Dock). Transports loaded landing craft to objective, where hold is flooded and pre-loaded craft move out under own power. Drydock characteristics of LSD also permit use in salvage operations. (Official U.S. Navy Photo.)

PERSONNEL LANDING CRAFT

LCI(L) ------Landing Craft, Infantry (Large)
LCP(L) ------Landing Craft, Personnel (Large)
LCP(R) ------Landing Craft, Personnel (Ramped)
LCVP ------Landing Craft, Vehicle, Personnel

[1] The term *shore-to-shore* in this discussion describes movement of particular elements of a landing force directly to the landing beaches without trans-shipment at sea.

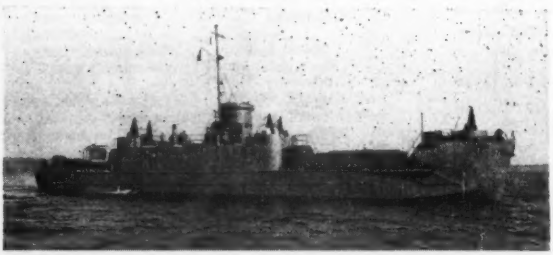
[2] The term *ship-to-shore* describes a trans-shipment of troops, equipment, and supplies from any type of suitable seagoing vessel to smaller landing craft, and the subsequent movement to the landing beaches.



LSM (Landing Ship, Medium). Ocean-going tank landing ship. With about the same capacity as the landing craft, tank, this vessel has greater speed and provides space for personnel accompanying weapons or vehicles. (Official U.S. Navy Photo.)

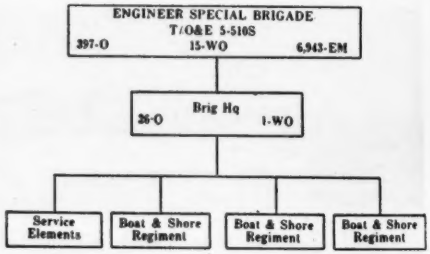
type of transportation, army units have been participating more and more frequently.

The largest of these army boat units is the engineer special brigade, which is organized to provide boat elements and shore logistic elements necessary for water transportation and shore support of a reinforced infantry division in a *shore-to-shore* operation.



LCI(L) (Landing Craft, Infantry, Large). Ocean-going infantry carrier designed for direct unloading of troops on beaches. (Official U.S. Navy Photo.)

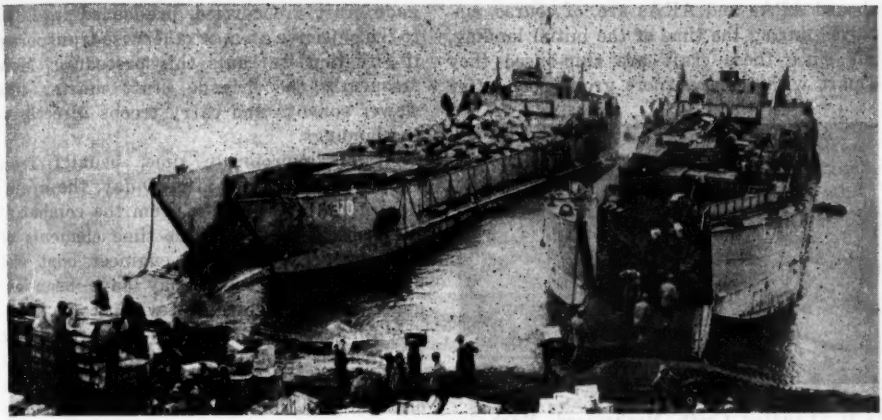
More specifically, the mission of the brigade consists of the administration, training and operation of a balanced amphibian force, so constituted that it may be employed as a unit or provide amphibian groups for special task forces.[1] In overwater operations of limited range, when employed as a unit, it can land a divisional size task force. In overwater operations of longer range, the brigade normally employs its ele-



ments in conjunction with naval forces who bring in the bulk of the troops. Concurrent with the tactical phase, or subsequent thereto, the brigade or elements of the brigade provide port and lighterage services. Each of the boat and shore regiments includes one boat battalion and one shore battalion, and is a balanced team capable of operating alone when service elements are attached. The brigade as a whole, in addition to various special small craft for navigation, salvage, supply and control, operates approximately 400 LCMs and ninety LCVPs. These craft have a range of approximately 300 miles, in actual operations, but a continuous voyage of about 160 miles in twenty-four hours is the limit of the crew's capabilities.

The boat battalions, each of

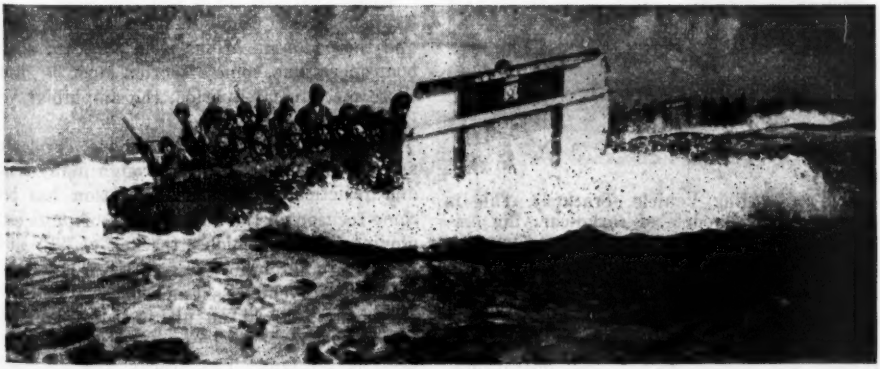
[1] In the European Theater of Operations the organization and function of engineer special brigades was modified to a considerable degree. There the brigade was generally composed of a headquarters and headquarters company, with three battalions of combat engineers employed as the basic elements. To this nucleus were attached troops from other branches of the service. The brigade mission was to facilitate and regulate the landing and movement of assault and build-up personnel and equipment over the beach, to unload and land all types of supplies from cargo ships, to move and receive supplies into dumps, to operate supply dumps, to establish and maintain communications and local security, and to evacuate casualties and prisoners of war to ships. The essential difference in function of this brigade, from those operating in the Pacific, was its more limited concern with shore activities.



LCT(5) (Landing Craft, Tank, Mark 5). Ocean-going, limited range lighter designed to land tanks or vehicles directly on beaches. Also used in lighterage operations and local coastwise movements.

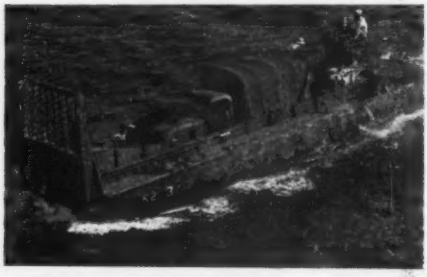
which operates approximately 130 LCMs and thirty LCVPs, are employed to transport and land combat teams on the far shore with supplies and equipment, to evacuate prisoners and wounded, and to effect re-supply, until relieved by higher authority.

In *ship-to-shore* operations, where distances involved are beyond the practical operational range of brigade craft, a naval force will transport the bulk of the invasion forces to the objective area. Brigade craft necessary for the initial operations are carried on APAs, AKAs, LSDs, or LSTs. The balance of brigade craft moves by stages, and arrives at the objective area shortly after D-day.



LCVP (Landing Craft, Vehicle, Personnel). Standard personnel carrier employed by both Army and Navy. Can carry thirty-six troops or one small vehicle, and discharge directly on beaches. (Official U.S. Coast Guard Photo.)

The naval landing craft normally carried aboard APAs and AKAs are, of course, employed during the time of the initial landing, but since these craft are ship-based they depart with the transport group soon after



LCM (Landing Craft, Mechanized, Mark 3). Designed to land one medium tank directly on beaches. This is the largest type of craft to be carried on APA's and AKA's. (Official U.S. Navy Photo.)

the original debarkation is completed. Brigade units also are in demand at successive assault operations, but normally continue to serve the beaches after naval units depart

LVT(2) (Landing Vehicle, Tracked). This is one of several models of cargo-carrying amphibious tractors. Later models have ramp aft. (Official U.S. Navy Photo.)

and until other lighterage facilities are available.

In *shore-to-shore* operations, when distances are short, within the operational range of brigade craft, the naval force furnishes the larger craft (LCI, LST, LCT, etc.) and, if APAs are employed, carries its ship-based LCVPs to the far shore. Brigade craft are carried, pre-loaded in LSDs to the objective area, or otherwise transported if situation warrants this procedure. More frequently the brigade craft muster into slower convoys and carry troops directly to the landings.

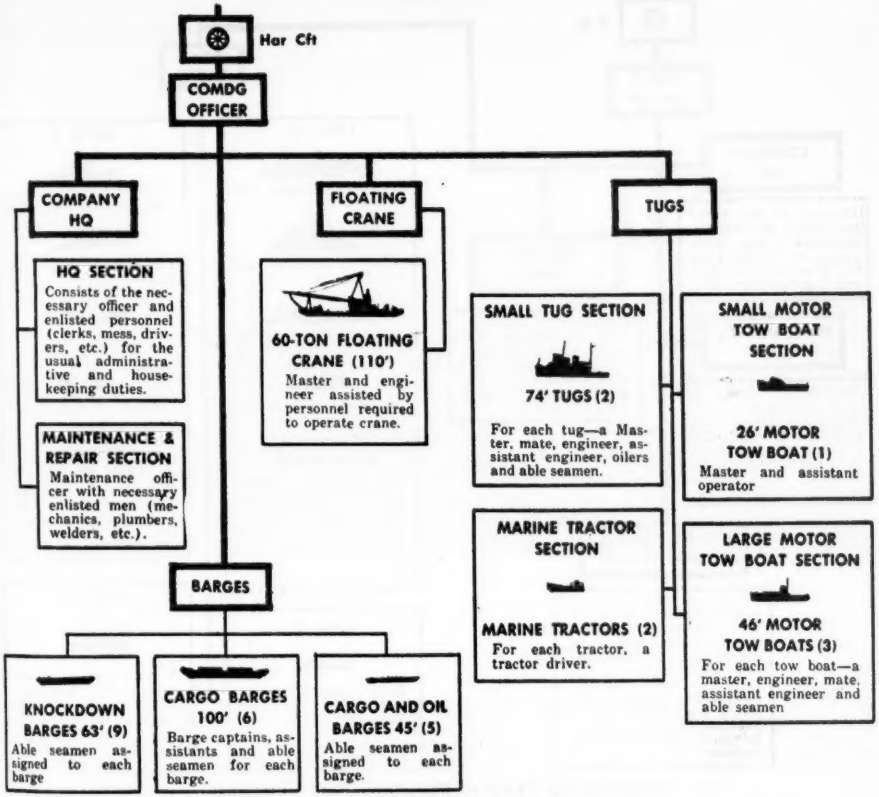
At an appropriate time, usually from twenty to sixty days after D-day, the operation of the beach passes from the combat to the service phase. At this time elements of the brigade such as the engineer boat and shore regiment, which may have been engaged in tactical landings, will become available for secondary missions. Upon release by the tactical commander the regiment comes under SOS for operational control, and carries on lighterage and harbor services, administrative cargo and personnel movements in the area, and similar routine operations. When port facilities and lighterage services are developed, the regiment again returns to the control of the tactical commander, ready for employment in new operations.

The importance of the Engineer Special Brigade is clearly reflected in the recent recommendations, signed by General Douglas MacArthur, urging that this amphibious organization which has performed so well in the current war be given a permanent place in our military establishment.

Before turning to a consideration of the Transportation Corps' Harbor Boat Service, and the communications zone phase of small boat operations, some attention must be given those mechanical hybrids, the amphibian vehicles.

Both the army and navy have developed amphibian vehicle units. Through many tests and practical operations, attention has become focused on the development of units employing landing vehicles, tracked (LVT), and 2½-ton amphibian trucks (DUKW).

Landing vehicles, tracked (LVT), are pontoned tanks of an all steel construction and are designed to be operated in water as well as on land. The tracks are equipped with grousers which provide traction on land and propel the vehicle in water. Two basic models have been developed, one for carry-

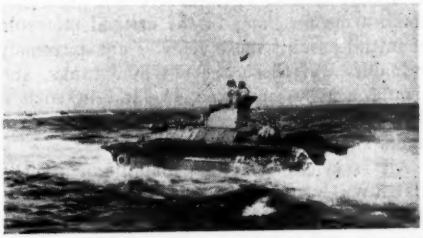

Har Cft
COMDG OFFICER
COMPANY HQ
HQ SECTION
Consists of the necessary officer and enlisted personnel (clerks, mess, drivers, etc.) for the usual administrative and housekeeping duties.
MAINTENANCE & REPAIR SECTION
Maintenance officer with necessary enlisted men (mechanics, plumbers, welders, etc.).
FLOATING CRANE
60-TON FLOATING CRANE (110')
Master and engineer assisted by personnel required to operate crane.
TUGS
SMALL TUG SECTION
74' TUGS (2)
For each tug—a Master, mate, engineer, assistant engineer, oilers and able seamen.
SMALL MOTOR TOW BOAT SECTION
26' MOTOR TOW BOAT (1)
Master and assistant operator
MARINE TRACTOR SECTION
MARINE TRACTORS (2)
For each tractor, a tractor driver.
LARGE MOTOR TOW BOAT SECTION
46' MOTOR TOW BOATS (3)
For each tow boat—a master, engineer, mate, assistant engineer and able seamen
BARGES
KNOCKDOWN BARGES 63' (9)
Able seamen assigned to each barge
CARGO BARGES 100' (6)
Barge captains, assistants and able seamen for each barge.
CARGO AND OIL BARGES 45' (5)
Able seamen assigned to each barge.

Organization Chart of Harbor Craft Company.
The above organization is illustrative only, for units are actually built up one boat at a time to meet specific requirements, in a particular operation.

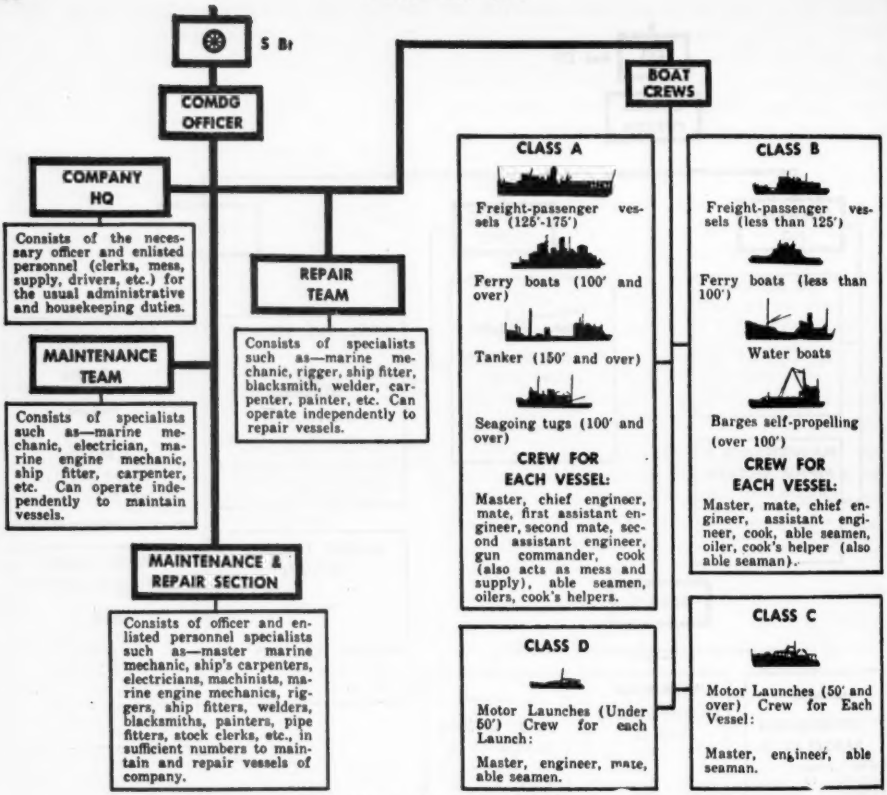
ing cargo or personnel, another to provide an armored combat vehicle.

The army's amphibian tractor battalion (T/O&E 17-125) has an aggregate of 119 amphibian tractors. Each of the two companies comprising the battalion operates fifty-one of these vehicles, and is so organized and equipped that it is capable of transporting, in one lift, a battalion landing team.

The army's amphibian tank battalion (T/O&E 17-115) is composed of four companies, each of which operates eighteen amphibian tanks. These vehicles are capable of delivering close range fire on defended beaches



LVT(A)(1) (Landing Vehicle, Tracked). The LVT(A)(1) is an amphibious tank. Later models have greater fire power. (Official U.S. Navy Photo.)


S B
COMDG OFFICER
COMPANY HQ
Consists of the necessary officer and enlisted personnel (clerks, mess, supply, drivers, etc.) for the usual administrative and housekeeping duties.
MAINTENANCE TEAM
Consists of specialists such as—marine mechanic, electrician, marine engine mechanic, ship fitter, carpenter, etc. Can operate independently to maintain vessels.
REPAIR TEAM
Consists of specialists such as—marine mechanic, rigger, ship fitter, blacksmith, welder, carpenter, painter, etc. Can operate independently to repair vessels.
MAINTENANCE & REPAIR SECTION
Consists of officer and enlisted personnel specialists such as—master marine mechanic, ship's carpenters, electricians, machinists, marine engine mechanics, riggers, ship fitters, welders, blacksmiths, painters, pipe fitters, stock clerks, etc., in sufficient numbers to maintain and repair vessels of company.
BOAT CREWS
CLASS A
Freight-passenger vessels (125'-175')
Ferry boats (100' and over)
Tanker (150' and over)
Seagoing tugs (100' and over)
CREW FOR EACH VESSEL:
Master, chief engineer, mate, first assistant engineer, second mate, second assistant engineer, gun commander, cook (also acts as mess and supply), able seamen, oilers, cook's helpers.
CLASS B
Freight-passenger vessels (less than 125')
Ferry boats (less than 100')
Water boats
Barges self-propelling (over 100')
CREW FOR EACH VESSEL:
Master, mate, chief engineer, assistant engineer, cook, able seamen, oiler, cook's helper (also able seaman).
CLASS C
Motor Launches (50' and over) Crew for Each Vessel:
Master, engineer, able seaman.
CLASS D
Motor Launches (Under 50') Crew for each Launch:
Master, engineer, mate, able seamen.

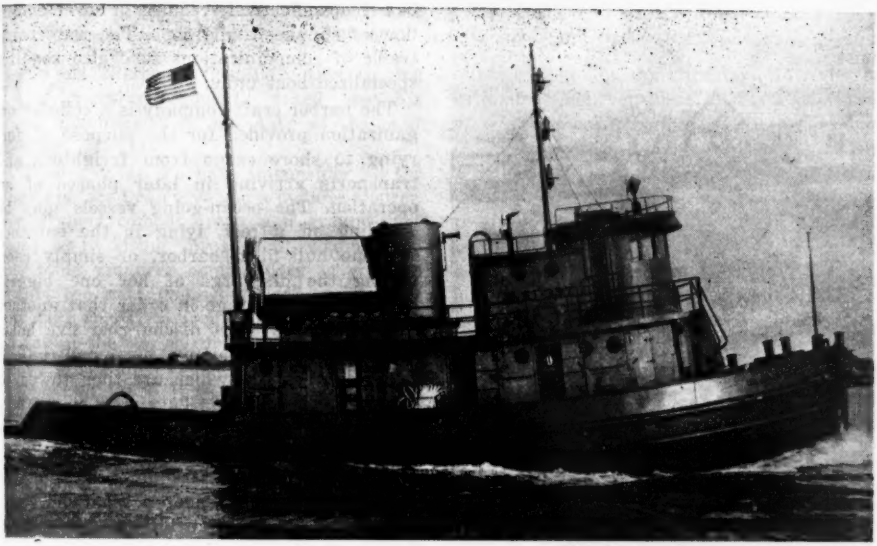
Organization Chart of the Small Boat Company.

from offshore. Their low silhouette, which permits them to drop from view periodically as they ride the waves, presents a very unprofitable target. Their armor can withstand small-arms fire, and in the critical moments of initial assault these vehicles are extremely valuable. But these are not land tanks, and should not be employed on land in such a capacity. Once the beach is gained, standard tanks should take over.

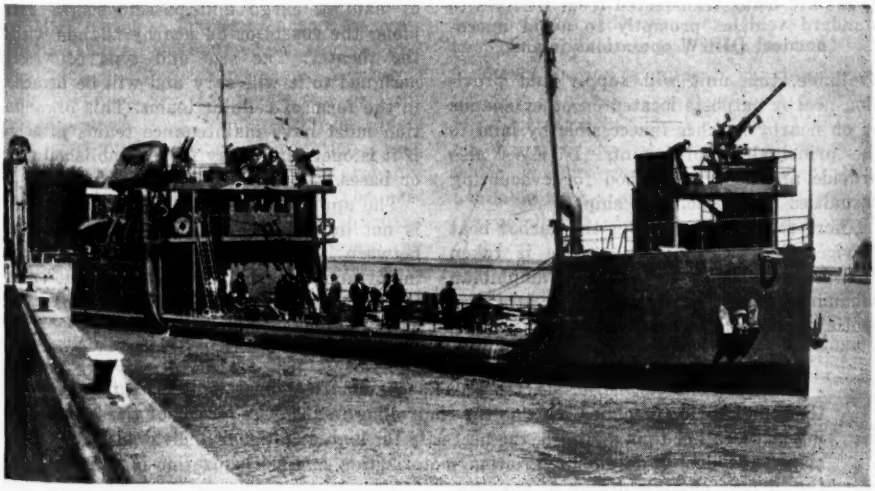
All services employ amphibian trucks (DUKWs), sometimes in the early assault phase of operations, sometimes in the routine tasks in well established bases. This vehicle is as popular as it is ubiquitous.

The army's amphibian truck company (T/O&E 55-37) provides vehicles designed for service operations on land and water. With automotive characteristics of a conventional truck, the DUKWs are, in addition, equipped with a water-tight hull designed in such a manner that the truck chassis and drive units are attached to and in the body of the hull. This company is normally assigned for supply functions in the theater of operations where amphibian vehicles are required to transfer cargo from shipside to shore dumps where pier facilities are not available.

In performing this mission, the company will provide lighterage service in the transfer of troops, impedimenta, and supplies from ships laying offshore directly to beachhead and inland dumps. In some instances, where a more effective inter-island service is not



Small tug. This vessel is driven by a 400-horsepower Diesel engine. She is used for pulling heavy tows and for maneuvering small ships in the harbor.



Tanker. This twin-screw, Diesel-propelled tanker is 180 feet long, makes approximately ten knots, has a fuel-carrying capacity of 18,000 gallons of Diesel oil.

DUKWs (Truck, 2-1/2-ton, Amphibian). These DUKWs are discharging a ship in the harbor. Loads are being transferred from DUKWs to standard vehicles promptly to avoid uneconomical DUKW operations inland.

available, this unit will supply and provision nearby outposts located on other islands or on nearby beaches inaccessible by land to the principal supply points. DUKWs also provide an excellent method for evacuating casualties from beaches to ships.

There remains to consider the harbor boat service. The title of this article is taken from the motto of the engineer amphibian command—*"Put 'em across!"* But it is essential that we appreciate that once across, and firmly ashore, the task of maintaining our troops effectively requires a never ending flow of supplies and troops. The waterborne traffic of communications zone also requires specialized boat units.

The harbor craft company is a cellular organization provided for the purpose of ferrying to shore cargo from freighters and transports arriving in later phases of an operation. The ocean-going vessels may be standing off a reef, lying in the entrance to some hulk-filled harbor, or simply completing the discharge of her one biggest hold in the anchorage in order that another full vessel may start discharging five holds at berth. Port company personnel unload cargo onto barges, which are then towed to shore and discharged. Tugs, tow-boats, marine tractors, a floating crane, and barges are included in the equipment of this organization. The specific task in hand dictates the matériel requirements. Wherever possible local services are exploited, and civilian fire boats, tugs, and barges are used to augment the capabilities of this organization.

In conjunction with the harbor craft company, the Transportation Corps has also organized a small boat company for the purpose of hauling cargo and passengers to bases along the coasts or on nearby islands within the theater. The size and type of vessels assigned to it will vary and will be attached in the form of cellular teams. This organization must have maintenance teams attached if it is operating away from established ports or bases.

The application of the harbor boat service is not limited to operations in harbors and between islands. The rivers provide a most important transportation system. But speculation aside, an understanding of small boat activity is essential.

Recent conflicts in Europe, the Far East, and Africa bear witness to the fact that the individual soldier remains the controlling factor. The tactics of the future intensify, rather than diminish, the necessity for high qualities of individual leadership. The object of developing aviation, motorization, and mechanization is to attain the highest possible degree of mobility.

President Franklin D. Roosevelt in an address at the graduation exercises of the U.S. Military Academy, 12 June 1939.

A-1 Checks the Angles

LIEUTENANT COLONEL LEIGHTON F. DOWNING, *Air Corps*
Instructor, Command and General Staff School

"CAN 'Personnel' support this coming operation, Jones?" asked the Air Force Commander of his A-1[1] at the staff meeting.

"W-w-well sir, I'll have to consider all the angles before I can give you a definite answer. We're short combat crews and ground-crew men; we're losing three group commanders and some squadron commanders on rotation within the next two weeks and we haven't any 'old heads' to replace them; morale is so low in the ------ Bomb Wing from those heavy losses on that last mission that twelve per cent of the men are AWOL. I am about ready with some recommendations, General. I can give you a definite answer in an hour, after I talk to the people in my Section and do some figuring."

"Jones, this is the third time recently that you haven't been able to give me an answer in a staff meeting. From now on you have your information ready when the rest of the staff does; when I ask the questions! Gentlemen, we'll meet here again in an hour!"

There are times, of course, when A-1 or any staff officer is unable to answer a question like that on the spur of the moment and be correct, but there is no excuse for never being prepared. Several points are brought out by Jones' reply. Apparently he didn't have very much advance information about this projected operation, which was probably available for the asking from A-3. The personnel situation was getting out of hand so far as Jones was concerned; he knew the problems confronting him, in a general way, but had not analyzed them with a view to making plans to correct them. He had failed to make an estimate of the personnel situation and arrive at specific plans, which when executed would solve his problems.

The estimating of the personnel situation is a continuing process; the job can never be considered as being final or finished because new elements are going to cause frequent changes in any situation. However, an estimate which considers all known facts as of a particular time and which is developed through to logical conclusions leads to the plan for personnel activity, that will be made effective by means of orders, directives and coordination with other agencies concerned.

What is the purpose of making a personnel estimate? It is a means of logically working out present problems and permits anticipation of future requirements, problems and adjustments in the light of past experience and future operations. It serves A-1 by permitting him to ascertain that all phases of his activity are being considered, that all coordination with higher, lower and adjacent units and staff sections has either been definitely planned or has taken place. Furthermore it enables A-1 to give his commander logical, prepared recommendations on all activities under his jurisdiction, at any time. Continuing estimates serve as a check to determine whether or not the directives and memos now published, and the administrative plan and administrative order now being followed are adequate, up-to-date and in keeping with the actual situation.

Should we use a guide in making an estimate? Positively yes! The form described and illustrated in "Think It Over"[2] by Colonel H. J. Schroeder provides a means by which we can consider all pertinent data available to A-1 at any one time. It reduces the possibility of error, either as a result of hurried recommendations or by the omission of vital data. It provides a convenient method of keeping abreast of the personnel situation. Further, it provides a means for guiding our mental processes along logical lines and forces a conclusion or decision as to the action you believe would solve specific problems. It is easy for any of us to do a lot of disconnected thinking; when scattered thoughts are bound together, they become a vehicle for producing positive results—the

[1] Assistant Chief of Staff—Personnel (Air Units).

[2] MILITARY REVIEW, June 1946, pp. 70-75.

estimate form gives us this opportunity to channelize our thinking.

If sufficient time is available and the situation permits, A-1 certainly should consider by mental process each problem step by step, reasoning out each of the factors until he arrives at the most workable solution as applicable to the existing situation. These conclusions should then be written down in such form that A-1 can use them as a check list to carry out his plans.

What are the sources of information that A-1 uses in making an estimate? Such data comes from many sources. Bear in mind that A-1 does not maintain an 'office of record,' but obviously he needs certain instruments to help him keep abreast of the situation; they are:

1. The A-1 Journal—contains a brief chronological record of activities of the A-1 Section and pertaining to the Section.

2. The A-1 Work Sheet—is a topical index arranged so that current information may be catalogued by subject.

3. The A-1 Situation Map—gives up-to-date picture of installations and unit dispositions which affect personnel activities.

4. The A-1 Policy File—contains basic data concerning operating principles for the A-1 Section, either published or unpublished, reflecting the purpose, concept and decisions of the commander.

Other sources are the other General and Special Staff Officers within the headquarters, various reports from other headquarters, points arising during conferences and facts known to A-1 himself. In some instances present administrative orders and other publications will require change, making necessary a consideration of those changes in an estimate.

The form for estimating the personnel situation is divided into five paragraphs as follows:

Paragraph 1.—MISSION.—This information is available to A-1 from directives of the commanding general, from A-3s plans and should be well known to A-1 at all times.

Paragraph 2.—SITUATION.—*a. Tactical Considerations.*—This information is available from A-2, A-3 and A-4. A-1 would normally be well-acquainted with this data because he must be familiar with it in order to ascertain that his plan ties in with that of the command. He must outline his own situation in the light of those facts and direct all his planning and activity toward furnishing all possible support to the tactical mission.

b. The Personnel Situation.—This section provides for specific enumeration of the personnel situation as of the time of preparation of the estimate. This is the first portion of the estimate prepared exclusively by the personnel officer. Here is listed the factual data concerning and status of:

(1) *Troop Strengths and Locations.*—(Indicate present strengths and locations.)

(2) *Replacements.*—(Shortages—present and anticipated, requisitions, depots, credits, processing and forwarding.)

(3) *Law and Order.*—(Stragglers, collecting points, AWOLs, discipline, military police, military justice.)

(4) *Prisoners of War.*—(Numbers, safeguarding, collecting points, evacuation, utilization, orientation for own troops.)

(5) *Burial and Graves Registration.*—(Organization, cemeteries, burials—numbers, records and reports, effects, labor.)

(6) *Morale.*—(Status of morale, postal and courier service, rest areas, special services, motion pictures, radio broadcasts, army exchanges, army periodicals, leaves and furloughs, welfare services, decorations and citations, religious activities, sanitation and hygiene.)

(7) *Civil Affairs.*—(Population density, control, military government, collecting points, MP units, security measures, food, medical care, supplies, pay.)

(8) *Personnel Procedures and Adjustments.*—(Classification, assignment, promotion, flying evaluation, reclassification, army publications.)

(9) *Personnel Estimates and Plans.*—(Personnel economy measures, manning table, area organization, quartering and billeting, personnel allocations.)

(10) *Civilian Employees.*—(Sources, pro-

curement, utilization and management, relation to civil affairs, relation to troops.)

(11) *Personnel Records and Reports.*—(Time of submission, period covered, form, channels, status reports.)

Each personnel activity should be listed under the proper sub-heading in paragraph 2*b* and those activities, that present a problem or indicate that they have a tendency to become a future problem, should be analyzed with a view to arriving at a solution of each.

A-1 should give full consideration to each activity and judge its potentialities and future trends, before he discards it as no problem. Many items which reach major proportions two or three months hence would never occur if the A-1 had previously recognized the indications.

Paragraph 3.—POSSIBLE LINE OF ACTION.—This section permits stating the lines of action which must in each case be carefully and completely considered, in order to arrive at the most logical situation of a problem in a given situation.

There is usually more than one feasible solution to any personnel problem, and the A-1 should consider the possible lines of action which occur to him, as well as listen to the suggestion of his assistants. The greatest error made by any staff officer is the failure to consider every possible line of action before he presents a solution to his commander.

Paragraph 4.—COMPARISON OF LINES OF ACTION.—This section allows the analyzing of each stated line of action; a discussion of those practicable with consideration of the advantages and disadvantages of each.

A recommendation to the commander should be developed through investigation of every possible line of action, as well as complete consideration of the advantages and disadvantages of each, which might solve the problem.

Paragraph 5.—CONCLUSIONS.—Here are stated the solutions to each of the problems listed in paragraph 2*b*. These conclusions, recommended actions or decisions should be those that are most logical or those which will solve your problems in the most workable manner in a particular situation at a given time. They should include as many of the elements of 'what,' 'where,' 'who,' 'how,' 'when' and 'why,' as may be appropriate. Include the General and Special Staff Officers or commanders who have to be contacted for coordination or to correct the existing situation. Be specific!

A conclusion which leaves a problem in the same status as it was prior to the estimate, or is so general that several interpretations can be made, has missed its mark. An A-1 must be specific in his recommendations, indicating that he has developed his conclusion to a concrete point in each instance.

Some of the activities considered in any estimate of the personnel situation are of sufficient importance to discuss with the Commander or the Chief of Staff or both. These matters will vary with the situation as it exists at a specific time, but it is well to remember that any problems which affect the ability of a command to perform its mission should be taken up with your superiors. Most of the other problems can be worked out within the personnel section with the cooperation and coordination of the other General and Special Staff Officers concerned in the activity.

Certainly A-1 must inform the Chief of Staff and the Commander of 'whether or not he can supply personnel support for the contemplated operations,' 'the unavoidable deficiencies in the personnel plan' and the 'major difficulties that he anticipates.'

The 'A-1 (Personnel) Plan' is the natural product of an estimate of the situation. It is made up of a group of proposed coordinated acts concerning personnel matters, which when combined with presently effective policies and procedures, and put into action will carry to completion all A-1 functions in a particular situation.

The 'A-1 Plan' or portions thereof forms the basis for the replies that A-1 makes to the Commander when questioned about his future activities or capabilities and his ability to support the mission.

G-2 Operations in Combat

LIEUTENANT COLONEL CHARLES J. PARSONS, Jr.
Assistant Chief of Staff, G-2, 102d Infantry Division

INTELLIGENCE in war consists primarily of checking, evaluating, and most of all, continually seeking every bit of information available. This was proved during the three winter months that the 102d Infantry Division was holding the line of the Roer River, when Intelligence in the division reached its highest point. During this period, by means of observation posts, statements of prisoners of war, aerial photos, and nightly patrols across the river, the division was able to obtain complete order-of-battle information and locations of all enemy forces holding the east bank of the river. Not only were company, platoon, and squad boundaries determined, but the location, strength, and number of weapons in each enemy pillbox and strongpoint were determined. Locations of mine fields and barbed-wire entanglements were accurately plotted.

All of this information proved to be very accurate and, needless to say, was of great value in planning and executing the assault crossing of the river.

G-2 Operations

During combat, the operations of the intelligence agencies of the 102d Infantry Division were conducted in accordance with the principles laid down in the Field Manuals and as taught at the Command and General Staff School. The attachment of many specialist teams to the division was of great assistance and made the G-2 Section even more of a coordinating agency than previously was the case. Information gained about the enemy and terrain came from prisoners of war, from documents, through aerial photographs and aerial reconnaissance, from patrol and observation reports, and from other miscellaneous sources. It is difficult to indicate the relative value of the source material, as difficulties of operations, condition of weather, and frequently unreliability of communications caused estimates to be made on the data available at the moment.

Organization of G-2 Section

As a matter of interest, the G-2 Section was composed of three officers and seven enlisted men provided by the Tables of Organization, plus one officer and two enlisted men of the attached Order of Battle Team which functioned as an organic part of the section. The enlisted men were organized in two shifts of four men each for twenty-four hour operation. Each shift was composed of a draftsman, typist, journal clerk and telephone operator, and one member of the Order of Battle Team. The chief clerk was not assigned to either shift but was available for duty at all times. The section was trained in depth and all men were capable of taking over any duty therein. The only records kept were the journal and message file, both of which were prepared in duplicate. Information for the daily periodic reports was gained entirely from the periodic reports of lower units and from the message file. A telephone extension was installed and every telephone message was recorded by the journal clerk and entered in the message file and journal. Intelligence summaries (ISUMS) were required four times daily from the infantry regiments and division artillery, and were also reported four times daily to higher headquarters. The officer-in-charge of the Order of Battle Team was used as the G-2 representative in the War Room, where he supervised the posting of the G-2—G-3 map, and was kept informed of the latest enemy activity. The Assistant G-2 prepared the daily periodic reports and supervised the operation of the section. The Captain, Assistant G-2, was charged with preparation of terrain studies, sand-table reproductions, map distribution, and censorship. Officers of the section rotated on night duty, and at all times operated on a twenty-four hour basis.

Attached Teams

The specialist teams attached to the division were of great assistance to the G-2

and were the source of much valuable intelligence.

The Photo Interpretation Team operated in the division command post adjacent to the G-2 office. They received and forwarded to higher headquarters all requests for photos from units of the division, interpreted all photos received, prepared town plans of all towns in the projected zone of operations, and prepared aerial mosaics. Every photo distributed to the lower units contained a north arrow and a coordinate reference, thus making it possible for a platoon leader to orient the photo in a minimum of time. As often as it was possible, aerial photos were distributed on the basis of one photo for each rifle-squad leader. In static situations this could be done, but in fast-moving situations it was impossible. The Photo Interpretation Team was organized into two shifts for twenty-four hour operation.

The Order of Battle Team functioned as an organic part of the G-2 Section and maintained a situation map showing at all times the location of all German divisions on the Western Front. A card index file containing all divisions in the German Army was maintained up to date at all times.

Three Interrogation of Prisoners of War Teams and one Military Intelligence Interpreter Team were attached to the division during operations. The Military Intelligence Interpreter Team was used exactly as were the Interrogation of Prisoners of War Teams. One team was attached to each of the infantry regiments and one team was assigned to the division prisoner-of-war cage. All prisoners were interrogated twice: at the division collecting point located in the vicinity of the regimental command post where information of value to the regimental commander was obtained, and again at the division cage where information gained in previous interrogation was checked and further information of value to higher headquarters was obtained. Information gained from prisoners at the regiment was transmitted immediately by phone to division and a copy of the interrogation followed.

The Counterintelligence Corps (CIC) Detachment during an advance was subdivided and a detachment attached to each of the infantry regiments. During static periods the CIC Detachment was broken up into smaller detachments and each detachment given an area of responsibility. The commanding officer of the CIC Detachment at all times remained in close proximity to the division command post.

Scouting and Patrolling

The EEI [Essential Elements of Information] were announced periodically to the units of the division and at times the number of patrols was prescribed, but the size, composition, route of the patrol, arrangements for artillery support, and coordination with the adjacent unit was always left to the subordinate unit. This method of coordinating on the ground proved to be very satisfactory and was much preferred by the subordinate units. The only coordinating done by division was with adjacent units or between the regiments and the Reconnaissance Troop.

Patrolling technique varied in the regiments. One regiment formed a battle patrol of one officer and twenty-four enlisted men, all volunteers, who were quartered together in the regimental rear areas and had no other duties but patrolling. The other two regiments obtained patrols from the rifle companies and the Intelligence and Reconnaissance Platoon. Both systems worked very well. The methods of control, equipment, arms, and size of the patrols also varied. However, certain principles were observed by all patrols within the division. All patrols were given their mission at least twenty-four hours in advance. All were thoroughly briefed as to the mission, terrain, artillery support, etc. All were supplied with latest aerial photos of terrain, over which the patrol was to operate and the patrol leader, at least, and if possible the entire patrol, was taken to an observation post in daylight and shown the ground over which it was to operate.

Public Relations

A very important and oftentimes overlooked function of the G-2 Section is public relations. No personnel or equipment are

provided for this section and it was realized the personnel would have to be provided and equipment obtained to take care of and orient the swarm of correspondents and visitors who descend on a division command post when an important action is about to take place. A section was organized composed of one officer, one typist, one rewrite man, and one photographer. In addition, a Public Relations Officer was appointed in each of the lower units. A reporter from each regiment was called to division headquarters before an operation was to begin to act as guides for correspondents. A situation map was maintained by the Public Relations Officer for the briefing of correspondents. Routine stories, awards, promotions, etc., were sent in by the units, compiled and edited by the rewrite man, and forwarded to higher headquarters.

Terrain Studies

The importance of terrain in all operations was clearly understood by all units and continually stressed by the division commander. Before every operation a terrain study was prepared and distributed to all units. In addition, before any major operation a sand-table reproduction of the terrain on as large a scale as space and facilities would permit was constructed at division headquarters. Lower units in turn prepared sand tables of the area over which they were to operate. Frequent briefings were held around these sand tables and orders were issued to commanders grouped around the table and objectives pointed out.

These sand tables were constructed completely to scale, even to the heights of trees and sizes of houses, and were thought to be of considerable help and well worth the time and effort expended on them.

Maps and Map Issue

All maps were distributed by the Division Engineer as directed by G-2. Maps of scale 1:25,000 were used in static situations, but during fast-moving situations 1:50,000 maps and 1:100,000 maps were all that were needed or could be supplied. Ordinarily, map requirements could be foreseen and units were supplied with maps two days ahead of their contemplated use.

Cavalry Reconnaissance Troop

Reconnaissance missions were assigned to the Reconnaissance Troop by G-2 and security missions were assigned by G-3. However, no missions were assigned to the troop by G-3 without first coordinating with G-2. During the defensive phase of operations, no suitable reconnaissance missions were available for the Reconnaissance Troop. Security missions, anti-parachute patrols, and road patrols were assigned. Early in the action the troop was assigned a sector of the line to hold for a week. This proved to be a very wise move and conditioned the troop to battle while giving them a better appreciation of infantry weapons and the problems of the infantry. During rapid advances when communications were difficult, a platoon of the Reconnaissance Troop was attached to each of the assault infantry regiments. During seventy-five per cent of the time that this division was in combat, suitable missions for the Reconnaissance Troop were nonexistent. As a result, the troop was used on miscellaneous missions, such as command post guards, anti-parachute patrols, etc., and the morale of the troop suffered. During the twenty-five per cent of the time that a fast-moving reconnaissance agency was badly needed, the troop was found to be too small to perform all reconnaissance missions for an infantry division.

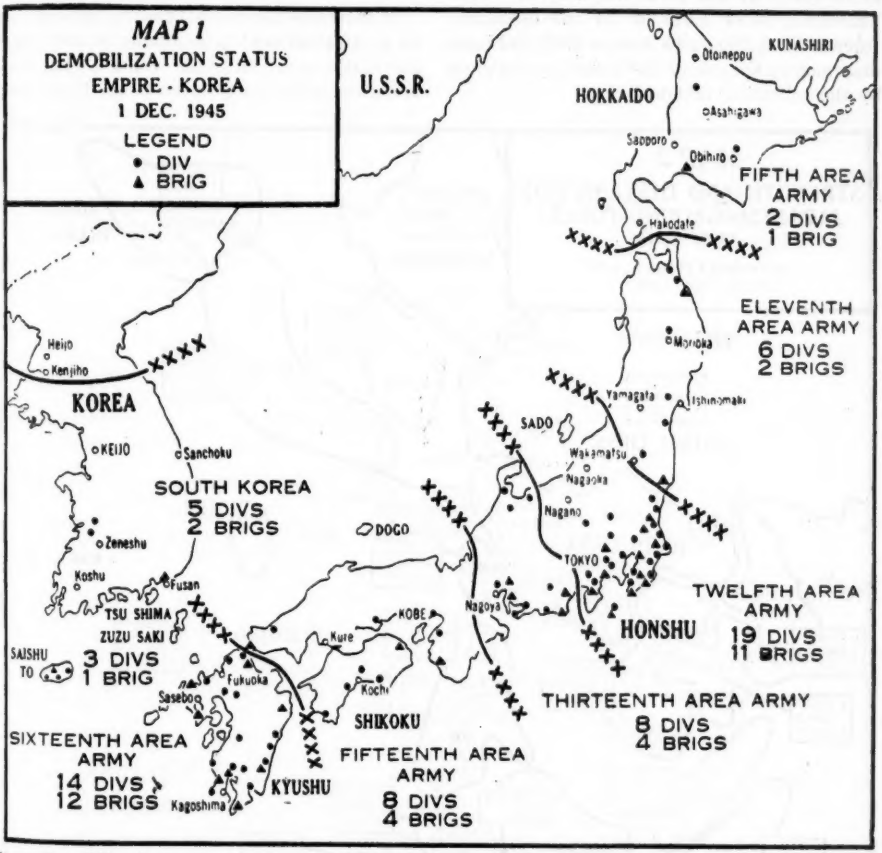
It is as illogical to scrap our armed forces while awaiting the growth of international cooperation as it might be to throw away a lifebelt with the promise of delivery on a new type of lifeboat.

General Omar N. Bradley

Demobilization and Disarmament of Japanese Forces

MAJOR GENERAL CHARLES A. WILLOUGHBY, *General Staff Corps*
Assistant Chief of Staff, G-2, United States Army Forces, Pacific

ALTHOUGH the term "demobilization" has been applied to the process through which the Japanese Army passed from 15 August to 1 December, it has in fact been termed a "dissolution" of their armed forces by the Japanese.



In the Empire area, as the results of the very efficient and effective directives issued by the Supreme Allied Commander, the Japanese demobilized 2,228,761 troops or over 95 per cent of their army (2,575,000), without incident, between 15 August and 1 November. The major tactical units stationed within the Empire included sixty divisions (excluding four antiaircraft divisions) and thirty-six brigades (Map 1). Demobilization within the Empire areas proceeded rapidly with the four area armies; Eleventh (North Honshu), Twelfth (Tokyo area), Thirteenth (Nagoya area), and the Fifteenth (Southwest Honshu, Shikoku) virtually completing the process by 17 September 1945. The Sixteenth (Kyushu) was the slowest to demobilize due principally to transportation breakdowns. However, by

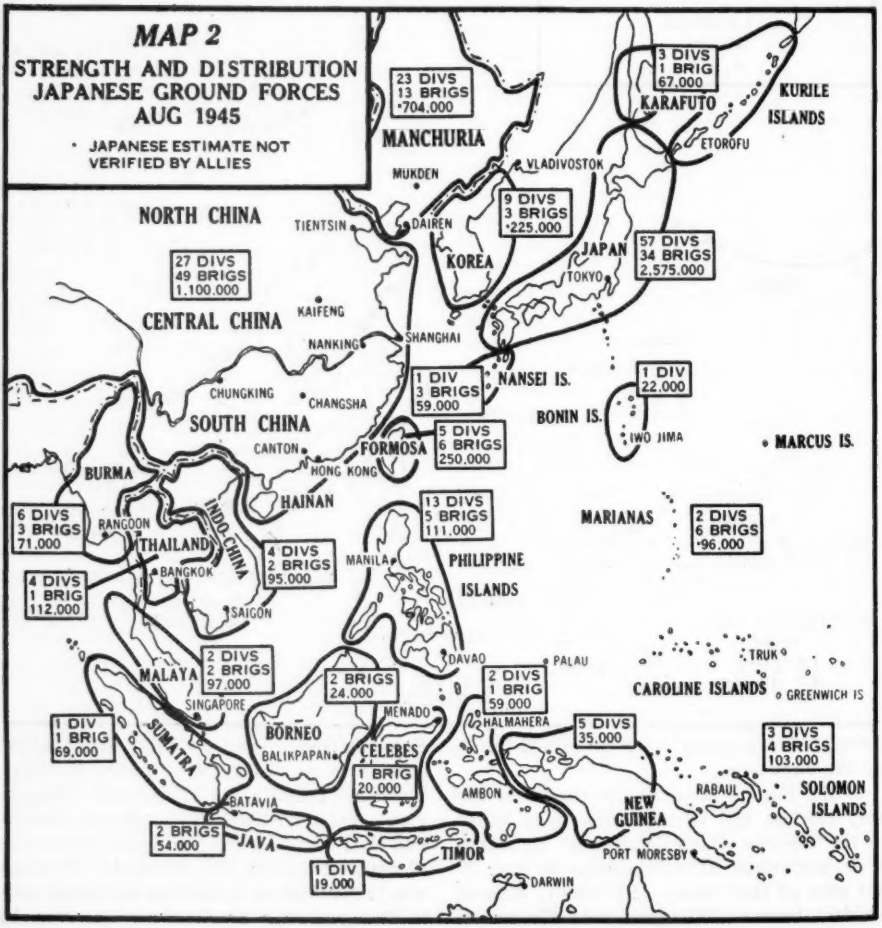
1 December only 76,518 troops remained to be demobilized and this total was composed of a minimum of soldiers and military civilians employed to demobilize troops from overseas, guard depot facilities and equipment and assist American occupation forces.

In regard to Japanese forces in overseas areas (Map 2) the great majority of troops numbering some 1,915,000 of the estimated force of 3,395,000 on 15 August 1945 had been disarmed by the end of November, as is shown by the following table:

SURRENDER ARMAMENT

Bayonets	1,632,027
Rifles and Carbines	1,590,878
Pistols—Revolvers	44,440
Mortars—Grenade Dischargers	102,300
Automatic Weapons	177,180
Field Artillery Pieces	10,533
Coast Artillery Pieces	1,005
Antiaircraft Artillery Pieces	3,049 (+?)
Rocket Launchers	4,058
Tank Guns (Dismounted)	147

It should be pointed out that no information as to disarmament is available in any areas currently under Russian control. In those areas the only figure shown is the total troop

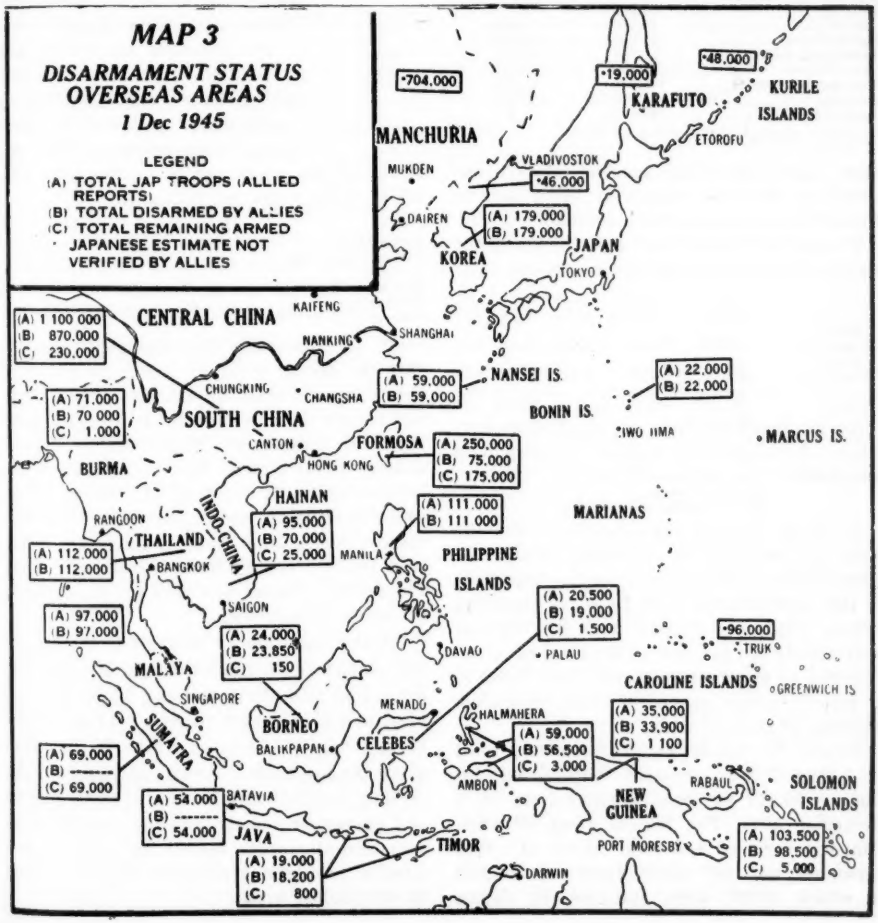


strength as of 15 August 1945 which was submitted by the Japanese War Ministry.

In other areas (Pacific Ocean Areas, Sumatra and China), the information contained herein is not too complete due to poor communications, lack of information, and the vast areas involved. However, of the 611,000 Jap troops remaining armed (Map 3), but excluding those areas under Russian control, many are being utilized as guards at dumps of various kinds and at the numerous Japanese POW camps. A recapitulation of the disarmament and demobilization of troops is shown in the table on page 30.

Air Demobilization

The Japanese Army and Navy Air Forces completed demobilization of units in the homeland as of 4 December 1945, according to reports from their respective departments. As of 15 August 1945, personnel of the two services were reported at 553,537. All Japanese aircraft, military and commercial, have been made inoperable. Military aircraft capable of offensive employment on 15 August were reported at some 8,000 in the homeland, with



a total of 11,711 in all areas. Including training planes, transports, utility planes and all other types the total reached 16,397. Destruction of these planes is being accomplished by the occupation forces.

Progress of demobilization is shown by the status of personnel reported as follows:

	15 Aug	*1 Sep*	*1 Oct*	*1 Nov*	*1 Dec*
Army (Homeland)	262,000	200,000	15,472	8,398	0
Navy (Homeland)	291,537	103,994	8,643	5,746	14
Totals	553,537	303,994	24,115	14,144	14

No air incidents have occurred since surrender. Investigations indicate full Japanese compliance with surrender terms.

Navy Demobilization

As of 15 August 1945 the figure for the total personnel of the Japanese Navy was given by their Navy Department as 1,693,223; of this total 303,042 were listed as stationed outside of Japan Proper; and 162,391, approximately ten per cent of the total were unassigned to any fleet or station, but listed in a miscellaneous group of sick, wounded, missing, physically unfit, etc.

Between 15 August and 3 December a total of 1,189,683 was reported demobilized, including 56,247 overseas personnel as of 3 December 1945. The Second Demobilization Ministry revealed the total figure of naval personnel not yet demobilized as 366,094 of which 38,107 were stationed in Japan Proper. All naval tactical troops in Shikoku have been discharged and the majority of the personnel in the other home islands are concentrated in port areas where they are being used as shore laborers and naval police or are manning ships being used to repatriate Japanese forces from overseas, and in minesweeping activities. Of the 246,795 personnel overseas, the majority are in the Southwest Pacific Area, with the greatest concentration in the Singapore-Netherland East Indies area.

The Japanese Navy furnished a list of their naval vessels which showed that they had no undamaged major fleet unit larger than cruisers. The remnants of the larger units of the fleet still afloat were given as follows:

Unit	*Undamaged*	*Damaged*
Battleships	0	1
Aircraft Carriers	0	5
Cruisers	2	6
Destroyers	29	12
Submarines	54	4
Escorts	69	26

On 12 September the Japanese reported that the directive for all warships and merchant ships to train all weapons fore and aft and render them inoperative had been carried out, and subsequent inspection by United States Naval Forces has verified their demilitarization. A total of 114 Japanese demilitarized naval vessels, including some formerly inoperational warships, are now scheduled under United States Naval supervision for use with Japanese crews for repatriation of Japanese nationals.

At the cessation of hostilities, there were 900 Japanese merchant ships of over 100 gross tons still afloat, totaling 1,526,900 gross tons, and 455 wooden vesssels totaling 77,693 gross tons. By 1 October, authority had been given the Japanese to resume operations under certain restrictions of some 317 steel cargo and passenger vessels, totaling 388,600 gross tons, and all wooden vessels. In addition, permission has been granted to resume fishing in established areas.

DISARMAMENT AND DEMOBILIZATION

Area	*Strength 15 August*	*Disarmed Current Reports*	*Number Remaining Armed*
Japan	2,575,000	2,575,000	———
Kuriles-Karafuto	67,000*	———	———
Korea	225,000*	179,000	46,000 (?)
Manchuria	704,000*	———	———
China	1,100,000	870,000	230,000
Formosa	250,000	75,000	175,000
French Indo China	95,000	70,000	25,000
Thailand	112,000	112,000	———
Burma	71,000	70,000	1,000
Malay Peninsula	97,000	97,000	———
Sumatra	69,000	———	69,000
Borneo	24,000	23,850	150
Java	54,000	———	54,000
Philippines	111,000	111,000	———
Ryukyus	59,000	59,000	———
Celebes	20,500	19,000	1,500
Timor-Flores	19,000	18,200	800
Haimahera-Arafura	59,000	56,500	2,500
New Guinea	35,000	33,900	1,100
Bismarcks-Solomons	103,500	98,500	5,000
Volcanos	22,000	22,000	———
Central Pacific Is	96,000*	?	?

*Japanese estimate not verified by Allies.

Joint Air Defense

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THE purpose of Air Defense is to defend friendly forces or installations from attacks by hostile aircraft. The accomplishment of this mission requires consideration of the following factors:

1. Collection, evaluation, and dissemination of information regarding the approach and subsequent movements of hostile aircraft.
2. Control of fighter defense aircraft in the air.
3. Establishment and control of antiaircraft fire.
4. Passive defense measures such as camouflage, concealment, and dispersion.

These factors apply to the Air Defense of any position whether it be a land area or sea forces.

Air Defense of Land Areas

The defense of land areas requires protection from attack by enemy aircraft of all military targets in the area. These are normally widely scattered throughout the area and there is usually a corresponding dispersion of the air defense units to provide adequate coverage. The land defense after being set up is usually fairly static, and very efficient communications nets can be established among the various defense units. The perimeters of the defense areas are the most vulnerable, since less warning time can be given of the approach of hostile aircraft. The deeper a penetration is made into the area, the greater is the concentration of fighters which can intercept the enemy flight. The large area to be defended requires a large expenditure of effort, and, to reduce this effort to a minimum, effective radar warning nets are established. The more effective the warning service, the less aircraft are required to furnish adequate defense. For this reason the normal method used is to keep the fighter units on ground alert rather than to attempt to furnish air patrols.

Air Defense of Forces Afloat

The air defense of forces afloat is similar to that of a land area in that the primary mission is to provide protection from air attack. However, a different technique is required for several reasons. The defense area of a force afloat is comparatively small. It includes only the number of ships in a fairly compact formation. Certain of these ships are more valuable than others and so naturally will be protected first. However, all ships in the convoy or force are potential targets and must be defended. Air defense afloat then is more on the order of a "point" defense rather than an "area" defense.

Another problem arises from the fact that the force afloat is moving. It will endeavor to keep information as to its location a secret, while on the other hand the enemy will use all the means available to locate and shadow this force in order to carry out attacks against it. For this reason it is necessary for the air defense of a force afloat to be effective enough to find and destroy every enemy scouting plane which approaches near enough to detect the ships. Another factor is that ships are very vulnerable to air attack. A single bomb from one plane can very well put one of our carriers out of action. Therefore every precaution must be taken to prevent that one plane from penetrating the fighter defense.

Information of approach and location of hostile aircraft must be obtained by the force afloat just as it must in the defense of the land area. However, since identification of friendly aircraft by (Identification of Friend or Foe) IFF is not always possible, it is imperative that the information center of forces afloat be provided with flight plans of aircraft which will be in the vicinity. This becomes complicated when flights from several carriers and from shore bases are concerned. Since the communications nets between the forces afloat and the shore bases are not as efficient as the permanent nets set up ashore, a very high degree of coordination must be maintained.

As was mentioned, combat patrols are rarely used in defense of land areas. However, for the defense of forces afloat in areas where enemy air action may be expected, it is normal to provide protection by keeping combat patrols in the air. This procedure is necessary for several reasons. As was previously stated it is of the utmost importance to prevent the enemy from locating and shadowing the force. It is possible to detect enemy scouts by use of radar before they can sight the ships, and with fighters already in the air their chances are excellent to intercept and destroy the enemy before he is able to send in a contact report.

Another reason is that a certain time element is required to launch planes from a carrier which besides providing the air defense forces will also probably be the most likely target for attack by the enemy. Unless warning as to the approach of hostile aircraft is given long in advance, it is very difficult to make interception with planes based at the target. Therefore, unless the carrier already has its planes airborne, it is forced to do two things at once: maneuver to launch planes in time to intercept the enemy, and take evasive action in order to avoid being hit. These two maneuvers are not very efficiently executed simultaneously.

Finally, since the ships are very vulnerable, it would be possible for a lone enemy aircraft to sneak through the defenses and launch an attack against the carrier before it could launch its own planes. This risk is greatly reduced by having the combat patrols in the air at all times.

The combat patrol, then, is normally used to provide air defense of forces at sea. The strength varies with the circumstances. A small force could be used as protection against snoopers and sneak attacks, while up to half the fighters available may make up the patrol when there is a threat of heavy air attack.

Forms of Joint Air Defense

The Army is normally capable of providing its own air defense ashore, while the Navy can usually provide protection for its forces afloat. However, there will sometimes be problems of air defense in joint operations. These may take one of the following forms:

1. Defense of a land area by both Army fighters and shore-based Navy or Marine fighter units.
2. Defense of a land area by ship-based fighters.
3. Defense of a force at sea by shore-based fighters.
4. Defense of a target (either land area or force at sea) by both shore-based and ship-based fighters.

Air Defense of a Land Area by Shore-Based Army, Navy, and Marine Fighters

The joint air defense of land areas by shore-based fighters of the Army, Navy, and Marines offers in general the same problem facing the normal Air Defense Command setup in the Army Air Forces. These common problems are solved in a similar manner, but certain different problems arise in the joint operations. The fact that the units making up the air defense forces come from different services makes no difference in the *organization* for fighter defense. However in the actual operations of the forces this scheme, which theoretically should present no difficulties, does require considerable coordination before a high degree of efficiency can be attained. Local, Army, and Navy doctrines must be well established and all units made completely familiar with all the doctrines. Administrative details must be taken care of by the exchange of necessary reports, radio frequencies must be assigned all new units, an efficient communications net must be established to include all operating units, and frequent drills must be held to insure that maximum use is being made of all the component units. The system is further complicated by the fact that Navy and Marine fighter squadrons are shifted about quite often, and each newcoming unit must undergo the same transition period of indoctrination before fitting smoothly into the air defense organization. Each unit involved must be made thoroughly familiar with the capabilities and limitations of the aircraft and equipment of the other units, and the over-

all commander must be thoroughly familiar not only with these same capabilities and limitations, but with the organization of each unit, to enable him to exercise proper command control of operations. All of the problems discussed are details which can easily be worked out by conferences, drills, and training.

Air Defense of Land Areas by Ship-Based Fighters

The next possibility of joint air defense operations considered is that where a land area is defended by fighters operating from a carrier or carriers. This use of carrier-based aircraft is justified only when land-based planes cannot carry out the mission. An example of this employment is the air defense of a beachhead established beyond the range of land-based fighters. When the need arises for this type of defense it is usually quite urgent, but the effectiveness of the defense will be of a temporary nature, since the vulnerability of a carrier prevents it from staying over-long in a hostile area.

The problems arising from this type of operation are somewhat different than those confronting land-based fighters in air defense. The area to be defended is comparatively small, but in addition to defending this pinpoint area another adequate blanket must be provided for the home carrier which will be moving about offshore. The normal method of accomplishing this is to run a constant combat patrol divided into two sections, one for the land defense and the other to protect the carrier. A reserve of fighters will be kept on board ship.

The command and control of the carrier defense patrol is completely in charge of the carrier commander. The strength of each patrol is decided in advance from an analysis of the expected hostile air activity. However, arrangements should be made so that both the land defense and carrier defense patrols can consolidate to meet a large threat.

The command and control of the land defense patrol is exercised by the best means available at the time. There are several different methods which may be used. The simplest method is to exercise control from the carrier; however, this requires that the carrier operate fairly close to the defended area in order for its radar equipment to be of full use. Local conditions of wind and hydrography might prevent the carrier from operating within its effective radar range, however, and close inshore operations are very dangerous when strong air opposition is encountered. This method would normally be used then when air opposition is weak and the carrier can operate within its effective radar range. It would require only a single combat patrol and the use of existing fighter control facilities.

Another method not having the restriction of carrier control provides for fighter direction control at the point to be defended, or on some nearby vessel. This method gives direct control to the officer in over-all tactical command through the air officer assigned the task of air defense. This officer can in addition to exercising fighter direction control, direct reinforcement when necessary of the combat air patrol. Alternate control centers should be established to take over in case of emergencies.

Air Defense Afloat by Shore-Based Aircraft

If the ships to be defended are within effective radar range of the shore fighter control system then the problem of the air defense is no different than that which is always present. However, if the ships are not within radar range then the problem is the reverse of the situation encountered in the defense of a land area by carrier-based planes. Orders for reinforcements and fighter direction would originate from ships. Radio communications, doctrines, patrol schedules, and all other necessary plans must be worked out long in advance.

Several other problems arise that are difficult of solution. If the force afloat to be defended is moving, considerable pains must be taken to determine a route, hold it and inform the fighters of the plan. Since radio silence will probably be maintained this will be the only method by which the fighters will be able to intercept the force. This involves

considerable overwater navigation with which the shore-based fighters are not too familiar, but in the case of convoys, patrol action out to the range of the fighters can be provided. However, in the case of combatant ships seeking out an enemy whose position is unknown, the problem is very nearly insurmountable without the use of radio homing procedures.

The plans for the adequate defense of ships from shore bases must include not only the communication and rendezvous provisions, but in addition the routing of ships must take into consideration the location of available fighter bases. Convoys will be routed where possible within the air defense sectors already set up, and where this is impossible, will plan the routes to stay within effective range of fighter bases as long as possible.

Air Defense by Both Shore and Ship-Based Fighters

Air defense either of a force afloat or a land area can be provided by a joint force working from both ship and shore bases. Here again the best over-all control is achieved when the controlling agency is established at the point to be defended. The control officers must be thoroughly familiar with all the types of aircraft being used.

This joint effort will be used when the number of shore-based fighters available for air defense is not capable of providing the necessary defense. They are then reinforced by carrier-based fighters up to the amount needed to insure adequate defense.

One special method which may be employed here is worthy of mention. Consider the case where a target to be defended is out of land-based fighter range; the carrier aircraft force in the area is capable of providing adequate air defense for the land area, but will not have sufficient force remaining to provide protection to the carrier bases; and the carrier bases are within the effective land-based fighter range. A setup can be established whereby the land-based fighters will provide the air defense needed to protect the carrier force, while the carrier-based planes conduct the air defense of the original target to be defended.

Planning Necessary for Successful Operations

Joint air defense operations as described are feasible and can be made to work. However, they require considerable detailed joint planning considering the following items:

1. The command responsibility must be clearly set up.
2. Having due regard to the operating ranges of radar and radio, the most effective control of fighter defense is best established at the point, or in the area being defended.
3. Communications channels must be prescribed and tested in advance.
4. The routing of shipping must be coordinated with respect to air base locations.
5. There must be a thorough knowledge on the part of controllers of the capabilities and limitations of aircraft and communications equipment used.
6. Aircraft units must be thoroughly indoctrinated and trained in both Army and Navy methods.
7. Coordination and frequent drills are necessary to be sure the plans will work.

We better be ready. We came within an ace of losing World War II. The creation of a similar situation again will result in the outright reduction of the United States to the status of a second class power. There is no need to dwell on the technical developments that have served to reorient our strategic situation. Even the layman can see that in modern war *surprise* has become the chief concomitant of victory. An army trained against surprise is the main toll gate on the road to security.

Captain Lloyd E. Jones, Jr., in "The Field Artillery Journal"

Rockets--They're Here to Stay

COLONEL A. R. MacKECHNIE, *Infantry*

The author of this article has been a member of the Army Ground Forces Rocket Board since it was first organized at Fort Benning in March 1944. Prior to that, he commanded a regiment of the 41st Infantry Division in the New Guinea campaign.—THE EDITOR.

THE recent publicity given to rockets, together with the knowledge of the activation of several rocket battalions in the Army, has resulted in a kindling of interest in these new ground weapons throughout our service. An observer from the European Theater, where rockets were used to a limited extent by our forces in the closing phases of combat operations, reports widespread interest, with reactions varying from enthusiasm on the part of those who have fired, or witnessed the firing of the newer rockets, to apathy, or violent distrust on the part of those whose information is based on rumor, or who have observed the earlier models.

Although rockets are comparatively new in our service, actually they were used before the cannon. Their earliest history shows them being used by the Chinese in 1232. The British used them in the Napoleonic Wars, and at Bladensburg, during the War of 1812, they were so effective against our green troops that they fled the field and permitted the British to occupy and burn the city of Washington.

The development of artillery cannon with rifled barrels and greatly improved ballistic qualities, in the latter part of the nineteenth century, resulted in the complete abandonment of rockets as weapons of war, until World War II. Since 1940, the British, Russians, Germans, and our own Navy and Air Corps have developed and employed many different types of rockets, and their success has led to their development, and finally their adoption, by our Army as a Ground Force weapon.

Rockets have always been inaccurate, as compared to a gun or howitzer, and their range considerably less than artillery shells of the same caliber. Development of weapons and projectiles in the past habitually has been with the view to increasing accuracy, range and effectiveness. The question naturally arises as to why we now reverse this policy in the case of rockets. A brief discussion of what a rocket is, and a comparison of the rocket with the howitzer may serve to answer the query.

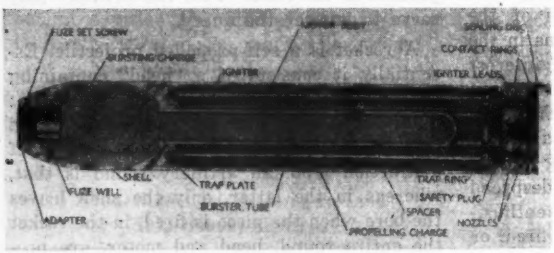
A rocket is a self-propelled projectile. Essentially it consists of a "head" containing the explosive, or other filler, and the fuze; and a "motor," containing the propellant and some form of stabilizing device. Its chief distinction from an artillery round is that, whereas in the latter, only the shell leaves the bore when the piece is fired, in the rocket the entire round, head and motor, are projected. This means that extra, or dead, weight is added to the rocket, reducing its range and efficiency, since "motor" fragmentation is not effective as a rule. Roughly speaking, a rocket is only about one-half as efficient as an artillery shell.

We might say that the theory of rocket propulsion is the reverse of that for an artillery shell. When an artillery piece is fired, the intense gas pressure created by the burning powder forces the shell out the muzzle, and, being restricted by the breech-block, causes the piece to recoil. To withstand these forces, the tube and breech-block must be made of heavy steel and a recoil mechanism and recuperator must be provided, all finely machined. The shell is stabilized by rotation imparted by the rifled barrel and it leaves the muzzle at its maximum velocity.

In the rocket, the motor itself is built to withstand the gas pressure from the burning propellant. Gas escapes through one or more holes, or venturi, in the rear of the motor, forcing the rocket forward. Since its propulsion depends upon the unimpeded flow of gas to the rear, the rocket launcher tube is left open, eliminating the need for a breech-block. This also eliminates recoil, obvi-

ates the need for a recoil-mechanism, and permits the use of light weight metals in the launcher tube and mount. Stabilization is provided either by fins attached to the tail, or by several gas-escape venturi, inclined at an angle to the long axis of the rocket, giving it a rotating motion.

Whereas, in the artillery round, all propellant powder is consumed within the bore, the propellant in the rocket motor burns for some distance after it leaves the launcher.



Sectional view of 4.5-inch Rocket, M16.

Its initial velocity is low, and it continues to accelerate throughout the burning period. This is the chief reason for the greater dispersion of rockets over the shell, since it permits the introduction of many forces and variables which do not affect the shell. Theoretically, if all burning was completed within the launcher tube, the rocket would depart at its maximum velocity and rate of rotation and would be as accurate as a howitzer shell. Practically, this is impossible since some propellants burn for several hundred feet, and a tube even fifty feet long would be impractical for field service.

The long burning time makes the rocket visible for a considerable distance and the gases escaping from the venturi at a high velocity stir up a cloud of dust and debris at the launcher position, making it difficult to conceal it from enemy observation. The hot gases are dangerous to personnel and matériel in its path, and occasionally small pellets of hot propellant fragments are ejected which may ignite dry grass or other inflammable materials. Operating crews and ammunition must be kept well to the *flank* of the launcher during firing, thereby slowing down reloading and the firing of successive volleys to some extent. Although rockets have *no recoil* they do have *"back-blast,"* and, except for expendable type launchers, the heat and blast is so severe as to damage the launcher and its firing mechanism, imposing additional engineering problems in design and protection of those items.

A comparison between the Army 4.5-inch rocket, M16 and the 105-mm howitzer shell, M1, further shows the following obvious advantages of the latter, assuming the bursting effect to be approximately equal:

a. Range—M1 (Charge 5)—8300 yards.

b. Probable errors at 4500 yards:
M1 (Charge 5)—Range—twenty-nine yards, Deflection three yards.
M16 —Range—61 yards,
Deflection fifty-nine yards.

c. Weight—M1 (shell)—thirty-three pounds.
M16 (round)—42.5 pounds.

Since the foregoing shows the rocket to be far less accurate and less efficient than

4.5-inch Rocket, M16 (left), and 4.5-inch Rocket, M8.

the gun or howitzer and has the additional disadvantages of excessive blast and flash at the firing position, why, then, are rockets used and do they have any qualities which offset their disadvantages.

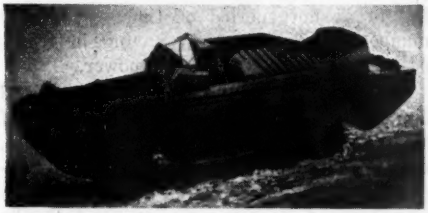
There have been two main reasons behind

the development of the modern rocket. The first is economy, the second is tactical, and both are based on the absence of recoil in the rocket. The rocket is so constructed as to withstand the pressure of gases within its motor body, and its projection depends upon the free and unimpeded flow of these gases from its venturi. Therefore it is unnecessary and undesirable to launch it from a heavy steel tube or to provide a finely machined breech-block or recoil mechanism. For these reasons the rocket launcher may be made from light materials, cheaply, rapidly, and with an enormous saving in manpower and in strategic materials.

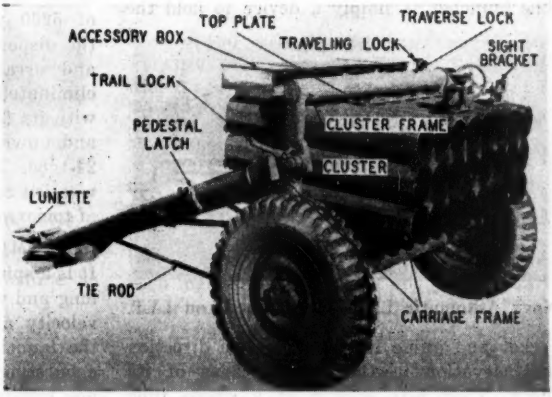
In 1940, following Dunkirk, the British were faced with the problem of re-equipping their army almost completely with rifles, cannon and other matériel, with limited resources, manufacturing facilities, and manpower. At the same time they were forced to defend themselves against the aerial "blitz." The antiaircraft rocket was the ideal solution since it provided great masses of fire and could be make quickly, cheaply, and required a comparatively small amount of steel. In the same way, the Russians and Germans found that it was impossible to provide all the artillery required for a modern war. The Germans, particularly, found that the aerial "blitz" could not replace artillery in the support of ground troops and had badly underestimated their artillery requirements. The rocket was a partial solution to their problems.

The trend of air warfare has constantly been toward more and heavier armament. Due to the inability of airplanes to withstand the heavy recoil forces set up by larger cannon the Air Force was quick to seize upon the rocket as a solution to their problem and today we find both bombers and fighters equipped with this weapon.

One of the problems which faced our Navy in its many landing operations in the Pacific, was how to fill the gap in the supporting fires from the battle fleet when the landing craft approached within 1000 yards of the beach. At that point the supporting fire had to be lifted to avoid danger to the small boats. This left the landing craft without supporting fire on the beach at the time it was most needed. These small boats were too light to withstand the recoil of cannons of the required caliber, and machine-gun fire alone was not sufficiently effective. Here again the rocket proved to be the answer since it could be fired from almost any type of landing craft, in intense volume, from multiple rail or automatic launchers. The effectiveness of these rockets, coordinated with naval gunfire and aerial attack, was evidenced in the slight opposition put up by the Japanese in the recent landings on Okinawa and in the Philippines.



Navy Multiple Launcher mounted in DUKW.

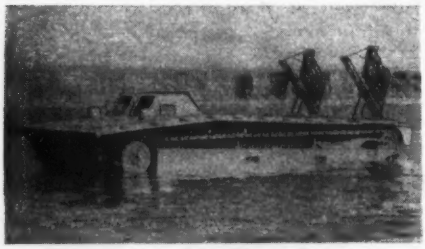


4.5-inch Multiple Rocket Launcher, T66.

Because of the lack of recoil and the fact that the rocket launcher may be made of light weight materials, it is possible to fire a number of rockets from the same mount, either by means of multiple rails or tubes, or by an automatic reloading device, without greatly increasing the total weight or decreasing the mobility of the launcher. This permits the delivery of a large volume of fire in a short period of time by a small number of men; a great saving in transportation, material, and manpower.

There are many types of rockets and launchers. The caliber, weight and type of filler, propellant, fuze, stabilizing device, range, and type of launcher and mount depend upon the purpose for which the rocket was designed. Rockets range in size from the 2.36-inch Bazooka, a shoulder weapon, to the V-Bomb used by the Germans. Some are fired from planes against ships and are designed to travel under water; some have shaped charges of TNT or C-2 composition for use against tanks or concrete walls and emplacements; some contain HE [High Explosives], some an incendiary mixture, some FS [Sulphus Trioxide Solution], WP [White Phosphorus], or other chemicals; some are designed to project cables, mine clearing devices, or antiaircraft targets.

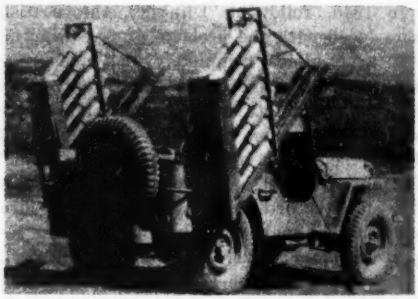
The construction of the launcher depends upon the type of rocket and its tactical use. The launcher is simply a device to hold the



Navy Automatic Launcher mounted on LVT.

rocket and guide it in the proper direction and elevation in the initial stages of its flight. They may consist of a single tube like the Bazooka or the 4.5-inch expendable "Bunker Buster," M12; they may be made of a plastic composition, aluminum, or steel; they may be built to reload automatically, like the Navy Mk 7, or with multiple tubes like the Army T34 and T66; they may be fired from the shoulder, a tripod, a two-wheeled trailed mount, from a truck, a tank, a boat, an airplane, or the packing case may be used as a launching device.

Just as in the case of rockets, launchers are constantly being improved and modified. Neither are perfect, and those in use today may be as inferior to those of next year as they are superior to those of last year. The



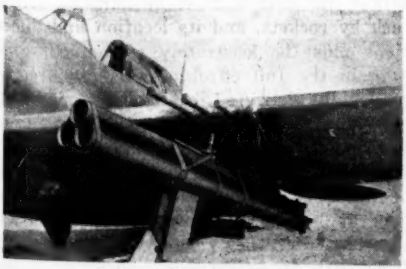
Navy Automatic Launcher mounted on "Jeep."

old M8, "fin-stabilized" rocket with a range of 4100 yards has been displaced by the new M16, "spin-stabilized" rocket, with a range of 5200 yards and approximately one-half the dispersion of the M8. In addition, short and erratic rounds have been completely eliminated. The old 8-tube, T27 Launcher with its flimsy and unreliable firing contacts and unwieldy mount has developed into the 24-tube, T66 Launcher, mounted on a two-wheeled carriage. The rockets and launchers of tomorrow may be changed just as radically.

The M16 has recently been standardized. It is a spin-stabilized rocket, thirty-one inches long and weighing 42.5 pounds. Its maximum velocity at a distance of seventy feet from the launcher is 830 feet per second. It has a bursting effect similar to that of the 105-mm howitzer shell M1. The propellant power in the motor is ignited by an electrical squib

to which current is applied through the launcher tube connections.

The T66 launcher has not been standardized and is still undergoing tests and modifications. It consists of a cluster of twenty-four aluminum tubes mounted on a two-wheeled, towed carriage, with split trails and a firing pedestal. It is designed for one man control of sighting, elevating, and traversing. Ammunition is loaded into the muzzles of the tubes by hand. The electrical firing mechanism is carried in a metal box mounted on top of the cluster near the breech. The box also carries tools and the sight. The launcher weighs about 1225 pounds and is capable of 800 mils elevation and a total traverse of about 360 mils. It is towed behind a 1½-ton (6x6) truck. The sight provided for the T66 launcher consists of the Quadrant, Elevation, T13; the Adapter, Telescope, M9; and the Telescope, Elbow, M62. Graduations are in mils and the Telescope, Elbow may be rotated through 6400 mils, permitting the use of reciprocal laying. The power source provided consists of a hand operated ten-cap blasting machine attached to firing cable which leads to the firing box where the current is distributed to each launcher tube in turn. Any generator, battery, or batteries, capable of

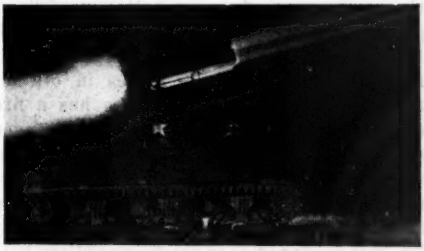


Army Air Forces 4.5-inch Launcher, M10.

producing eighteen to twenty-four volts, may be substituted for the blasting machine as a field expedient.

The Field Artillery Rocket Battalion Motorized, 4.5-inch Rocket, Motorized

Tables of Organization for field artillery rocket battalions, motorized, 4.5-inch, truck-drawn, provide for a battalion headquarters, headquarters battery, service battery, three firing batteries, and a medical detachment, a total of thirty-four officers, two warrant officers, and 645 enlisted men. The headquarters battery includes a headquarters section, maintenance section, operations and communications platoon, and a pioneer pla-



Army 4.5-inch Launcher, T34. Firing at night.

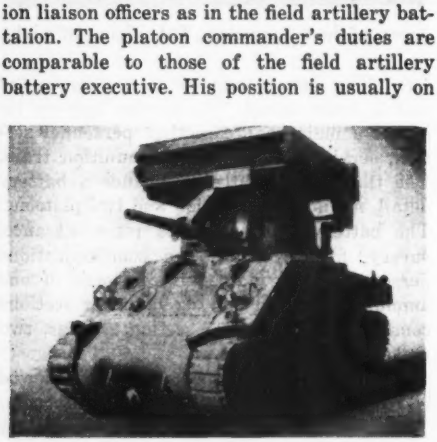
toon. The latter includes a pioneer squad and a dozer squad. The service battery includes a maintenance section, personnel section, service platoon, and ammunition train. The three firing batteries include a battery detail, maintenance section and two platoons. The battery detail includes reconnaissance, survey, fire direction, and communications personnel. Each platoon is composed of one ammunition squad and six launcher sections consisting of a chief of section, gunner, two rocketeers, and a driver.

The battalion is completely motorized and is equipped with thirty-six T66 launchers. The fire power available is really startling when it is seen that this *one battalion* can fire a 864 round volley of HE into an area in twelve seconds. This is the equivalent of seventy-two *battalions* of 105-mm howitzers firing a one round volley "Time on Target." In our battles in France and Germany there have been many instances when the fire of ten to fourteen battalions of howitzers has been massed upon a target 400 yards square, firing volleys of 120 to 168 rounds "Time on Target." Yet *one battery* of a rocket battalion can put down 288 rounds on the same area in twelve seconds—the equivalent of the fire of twenty-four battalions of howitzers. Think of the conservation of time, ef-

fort, manpower, and transportation, to mention a few items.

Rocket Employment

The employment of any weapon in combat is based upon its characteristics—its capabilities and limitations. Rockets have many of the characteristics of field artillery and the employment of rocket battalions follows generally the principles outlined in FM 6-101. Obviously there must be certain modifications based upon differences in organization and matériel. The battery has a fire direction center which functions in a manner similar to that of the field artillery battalion, while the battalion fire direction center operates like that of Division Artillery. There are no forward observers or infantry battalion liaison officers as in the field artillery battalion. The platoon commander's duties are comparable to those of the field artillery battery executive. His position is usually on



Army 7.2-inch Launcher, M17.

the flank of the firing position from which he controls his six sections by sound power telephone.

The rocket is essentially an area weapon and because of its dispersion is unsuited to the attack of point targets, to bracket or precision adjustments, or to close support of infantry. Its chief value lies in its ability to deliver an intense volume of fire into an area in a short period of time and without warning. To obtain the maximum effect from rocket fire it is necessary to mass a sufficient number of launchers to obtain the required volume of fire; to prepare accurate firing data; to restrict or prohibit registration.

Rocket units are attached to field artillery and are assigned general support or reinforcing fire missions. A battalion may be employed as a part of the Corps Artillery, or it may be attached to a Division Artillery. A rocket battery may be attached to field artillery battalion if desired.

The artillery commander issues instructions providing for reconnaissance, observation, intelligence, liaison, survey, traffic circulation, ammunition supply, assigns fire missions, position areas, and designates the firing chart to be used. The artillery is responsible for furnishing survey control to the rocket unit's position area, for target area survey and for observation and surveillance of rocket fires. At least one alternate position is assigned, in addition to the primary, and is prepared for occupation with the same care. Fires are prearranged whenever possible so that necessary survey may be completed, and fire data computed prior to occupation of position.

Targets should be selected and assigned with care. An appropriate target must be within effective range, it must be an *area* target, its nature must be suitable for attack by rockets, and its location and dimensions must be accurately plotted. In order to gain the full effect of surprise fire, fire is usually delivered based upon map data corrected with metro. Since precision adjustment is impractical it may sometimes be feasible to fire an eight round volley from one launcher, determine its center of impact and apply the corrections obtained to the data for other targets. Transfer limits from such an adjustment appear to be less than for artillery, viz., 1500 yards in range and 400 mils in deflection. Sufficient firing has not been conducted to date to determine the exact limits and it is possible that range limits may be better defined by using mils of elevation instead of yards in range.

Test firing and reports from combat areas indicate that the following *area* targets and missions are suitable for rockets:

a. Troops in the open, in trenches, and in assembly areas.

b. Enemy strongpoints, centers of resistance, and protected by *light* fortifications.

c. Lightly armored vehicles, tank and vehicle assembly areas.

d. Command posts, ammunition and supply installations.

e. Reinforcing artillery preparation or counter-preparation fires.

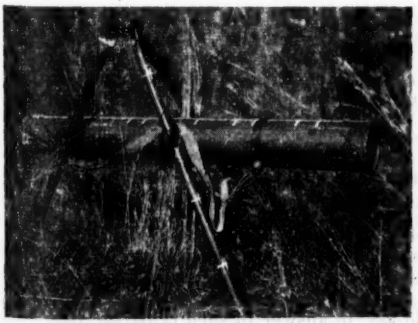
f. Harassing or interdiction fires on important areas such as defiles, bridges, and roads.

g. Enemy landing craft and troops disembarking.

h. Projection of smoke or other chemicals.

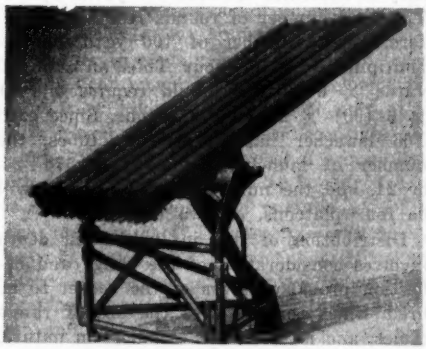
Attack of Targets

Rockets have been termed "erratic" or "inaccurate." These terms are misleading, and are in themselves "inaccurate." It is true that the individual rocket is not as accurate as an artillery shell, yet a number of rockets, fired under as nearly identical conditions as possible, will form a definite pattern on the ground, and the size and shape of this pattern can be predicted mathematically. This pattern is much larger than it would be for the same number of artillery shells, but this does not warrant the use of the term "inaccurate," otherwise the pattern and distribution of the shots within it could not be predicted.



Army 4.5-inch expendable type Launcher, M12.

In spite of the large dispersions, as compared to a howitzer or gun, the points of impact are dispersed regularly about the center of impact. Although this pattern is roughly elliptical in shape, for practical purposes it may be considered as a rectangle. The shape and dimensions of this dispersion rectangle change with the range at which



Army 4.5-inch Launcher, T27.

the shots are fired. At short range it is long and narrow; at longer range it approaches a square; at extreme ranges it is wider than it is long. It is important that this peculiarity be kept in mind in selecting firing positions, targets, computing ammunition requirements, and distributing fire.

In attacking an area target the rocket unit commander is faced with the solution to the following problem:

a. Selection of type of ammunition and fuze.

b. Amount of ammunition required.

c. Number of launchers or firing units required.

d. Distribution of fire in width and depth.

Selection of the proper ammunition and fuze depends upon the nature of the target and the effect sought. Personnel in the open, in open trenches, or light brush, may be attacked with HE using superquick, or air-burst fuze. Personnel under heavy woods, in houses or in fortified areas require HE with delay fuze. Combinations of superquick, delay, air-burst, and of HE and WP will often be most effective. Experience and judgment are required to determine the best solution.

The amount of ammunition necessary to accomplish the effect sought depends on the type of ammunition and fuze, the dispersion characteristics, and the size of the target to be covered. Limited firing indicates that twenty-four rounds of M16 rockets are necessary to neutralize an area 100 yards square. The total number of rounds required, therefore, is the number of 100 yard squares multiplied by twenty-four. Thus, an area 400 yards × 600 yards would require 4 (00) × 6 (00) × 24, or 576 rounds. Since each T66 launcher has twenty-four tubes, the number of launchers required is 576÷24, or 24, and the number of firing units will be four platoons, or two batteries.

Distribution of fire in width and depth involves consideration of the range and deflection probable errors of the rocket to be fired. Since this requires the use of range tables, and is somewhat technical in nature, the mechanics of distribution of fire will not be discussed. They are rather fully covered in WDTC No. 19, 1945.

Conclusion

The rockets, launchers, the organization, and methods of employment described have yet to be tested in battle. Actual combat experience, together with improvements which are being made constantly, especially in range, accuracy, and in the reduction of propellant flash and blast, may radically change many of the ideas suggested herein. The tactics and mechanics of employment of a weapon must be altered as the characteristics of that weapon change.

Rockets are comparatively new and untried weapons in our army. The comments on organization and tactical employment made herein have been based primarily on the 4.5-inch rocket, M16 and the T66 launcher. They are being improved and other types are being developed all the time. New and improved rockets will mean new and different methods of employment. You won't find units of the 4.5-inch rocket battalion attached to infantry battalion or regiments, but one of these days you may find rockets, other than bazooka in your Infantry Tables of Equipment, or special-purpose rocket units attached to your unit in the not too distant future. The rocket is not a cure-all, nor the "weapon to end all weapons." Don't expect it to perform miracles, because, like any other weapon, it has its powers and its limitations. But keep an eye on it—it's here to stay.

It is no small hindrance that in reaching this goal (the objectives of the American occupation of Japan) there are those throughout the Allied world who lift their voices in sharp and ill conceived criticism of our occupational policies; some, honestly inspired but with no knowledge of conditions existing in this far distant land, who would see applied here wholly unadaptable principles and methods; some who, lacking both vision and patience, see but the end desired, being blind to the means without which that end is impossible of achievement; some who opposed the guiding principles adopted at Potsdam and who, unwilling now to join in full unity of purpose, seek to foment dissatisfaction in others to the end that such principles be reshaped to their will, or their implementation be impeded; some who, from selfish motives, will exploit as slaves a thoroughly defeated nation and people, thus serving the identical policy of evil which Allied Soldiers opposed unto death on the battlefields of the world; and some who, for various reasons, are out of sympathy with Allied policies and aims, and seek to sabotage success of the occupation.

To the people of the allied world I would say, in answer to such criticism, that history has given us no precedent of success in a similar military occupation of a defeated nation—anywhere, at any time—to serve as a guide to assist in reshaping and to meet the aims to which we are here solemnly committed. It thus has become necessary for us, in meeting that challenge of the past, to devise new guiding principles and new methods by which to solve the problems of the future.

General of the Army Douglas MacArthur

Airborne Possibilities

LIEUTENANT COLONEL JOHN H. SWENSON, *Cavalry*
Instructor, Command and General Staff School

Lieutenant Colonel John H. Swenson served with the 4th Cavalry while it was still a Horse Regiment, and for approximately two years after the regiment's conversion to a Horse Mechanized Reconnaissance Regiment. He later organized the Reconnaissance Troop of the 82nd Division. After that division became airborne, Colonel Swenson requested a detail in the Infantry. He commanded a Glider Infantry Battalion from the time the division went overseas until 11 June 1944, when he was wounded in Normandy. Since being returned to duty, he has been at the Command and General Staff School as a student and instructor. —THE EDITOR.

WITHOUT in any way contradicting or in the least detracting from the epic accomplishments of the airborne forces, an excellent resumé of which was presented by Lieutenant Colonel Cornett in the December 1945 issue of the MILITARY REVIEW, I should like to point out that the full possibilities of the arm have by no means been developed.

As was pointed out by Colonel Cornett, airborne forces are the child of the recent war. Their development was the result of a crying need. Hence it was largely determined by the exigencies of the situation. Technical developments, though amazingly rapid, were unable to provide the means for accomplishing all that was desired. This has left the airborne forces with certain inherent limitations, the outstanding of which are a lack of sufficient supporting fire, and a very limited tactical mobility, as well as a precarious and tenuous lifeline of supply.

Toward the end of hostilities, technical developments to overcome these limitations were just emerging from the test stage. They did not emerge fully from the crucible of combat usage. The principal developments referred to are the recoilless rifles and mortars which would have gone far toward eliminating the weakness of limited supporting fire, and the CG 10-A Glider which had the capacity to deliver means capable of providing tactical mobility to airborne forces. The supply situation might well have been remedied by the employment of newly developed technical means of identifying delivery points for air transported supplies.

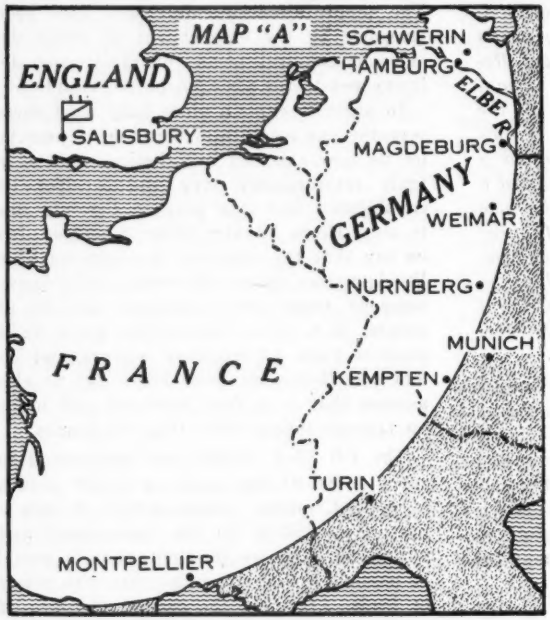
In order to explain more fully what these remedies can mean in airborne developments, let us now take an hypothetical unit of a truly revolutionary type and consider its capabilities. For this purpose I would like to use a Horse Cavalry Glider Squadron. Let us say that the squadron is composed of a Headquarters, three rifle troops, and a heavy weapons troop. Its armament consists of sabers, M-1 rifles, submachine guns, light machine guns, 4.2 recoilless mortars, and 57-mm and 75-mm recoilless rifles. Let us also assume that it is fully mounted and needs no transportation other than its horses.

The CG 10-A, which was constructed to carry a 6x6 2½-ton truck or 12,450 pounds of freight, makes transportation of such a unit a possibility. In the same space and within the same weight limitations, it would be possible to carry eight mounts with riders or loads. Assuming the combat strength of such a squadron would be 632 men and 800 horses, the squadron could be transported in 100 CG 10-A Gliders.

Now let us take a situation in which it would be feasible to employ any airborne force. The basic requirement is that we have air superiority, or can establish air superiority during the time we are convoying our troops by air, and can either maintain or reestablish that air superiority for a sufficient length of time to enable us to re-supply the airborne troops. The next requirement is that we can reasonably ascertain that the terrain on which we land these troops will be suitable for the landings, and that the area in which these landings take place will be sufficiently remote from enemy installations to enable the troops to assemble and organize before they are attacked in force.

Because the force we are considering is mounted, and each man has in his mount a

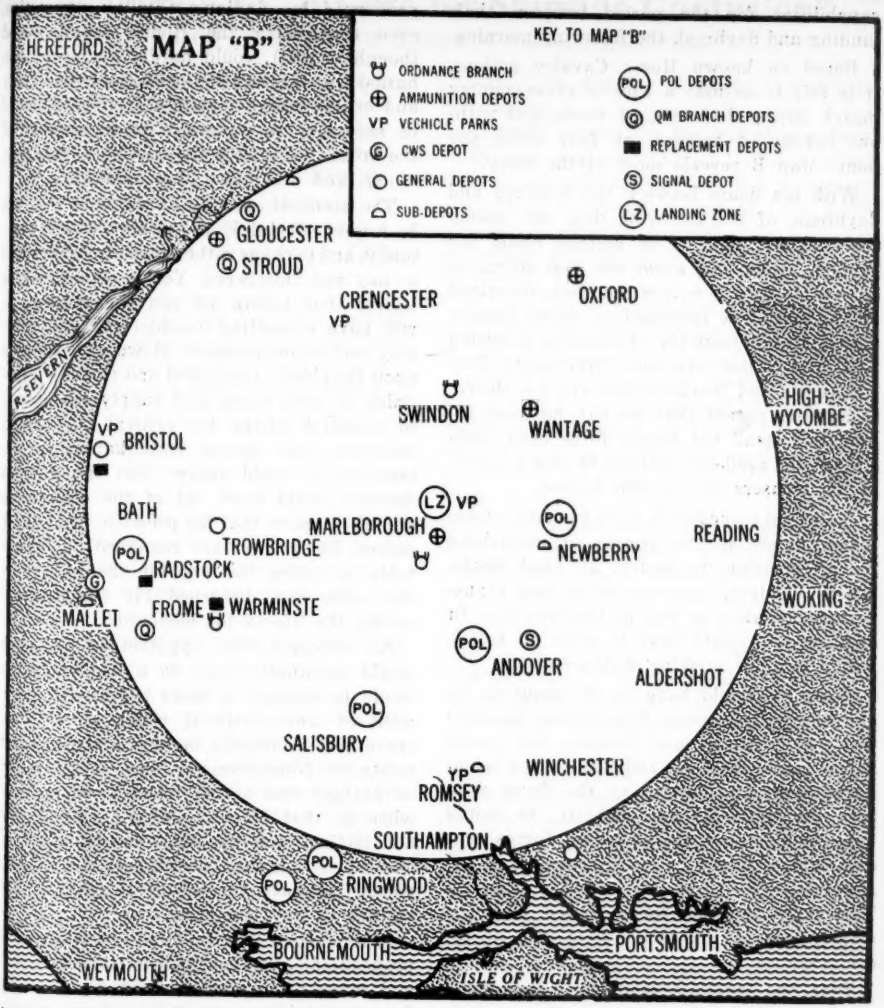
rapid means of transportation, these troopers should be able to unload from their gliders and assemble or rally in considerably less time than Infantry troops committed to action by the same method. In fact, because of their mobility they might well capitalize on a deliberately dispersed landing. Under certain conditions troops or even platoons might land separately and destroy bridges and communication nets while en route to the squadron rendezvous. Were this done, it would further add to that pandemonium in the defender's mind that accompanies an airborne landing. It seems fair, then, to assume that their chances of success for accomplishing an assembly, the most critical phase of an airborne operation, would be equal to or better than that of any now existing glider unit.



Having then established the feasibility of landing and organizing our theoretical force in enemy territory, let us next turn to their capabilities. The best historical guide to the capabilities of such a force when deep in enemy territory can be found in the history of the Russian Cavalry raids behind the German lines. Although Russian security has prevented us from gaining many specific facts, enough information has seeped through to make it reasonably certain that when Horse Cavalry units were able to place themselves in the rear of the main German battle positions they were able to operate successfully against the highly mechanized and thoroughly modern German war machine. The main factors which enabled them to do this were surprise and mobility, which further contributed to the element of surprise.

Let us now change our role to that of the enemy G-2. Let us assume that we know the foe has a Horse Cavalry Glider Squadron, and that he has sufficient air force to enable him to employ it at this time. If we are to state the enemy's capabilities, we must state that he is capable of attacking with a strength comparable to one battalion at any point within an arc the radius of which is the operational radius of his transport aircraft and the center of which is his forward air bases. (See Map A.) Remember you are the enemy G-2. Imagine your Commander's reaction to your profound pronouncements! Will he attempt to allocate sufficient troops to guard each and every vital area and installation within this area? Can he afford to? Will he build an unbreachable antiaircraft screen against this threat? He will undoubtedly try, but unbreachable static defenses have not yet proven practical. Will he, or indeed can he, construct obstacles which will render all possible glider landing fields unusable? Can he afford to ignore this capability?

Now let us reverse the situation and change our hats once again so that we become staff officers of an invasion force about



to strike Northern Europe. In order to bring this closer to home for more of us, let us consider that it is late May 1944, that our forces are marshalled and poised for the invasion of Normandy. Assume that late one afternoon we receive information that hostile horse glider forces have landed in a specific area. When we consider the probability that this glider landing would be coordinated with diversionary and deceptive measures, we might well allow several hours during which we would be uncertain as to the actual location of the glider landings. At any rate, if the landing areas had been well selected and the operation well-timed, it would be impossible to counter this action before nightfall. This, then, would leave us confronted with the task of ascertaining their

capabilities for the period between their landing and daybreak the following morning.

Based on known Horse Cavalry actions, it is fair to assume a rate of cross-country march during darkness, off roads, and without benefit of bridges, of four miles per hour. Map B reveals most of the story.

With ten hours between the landings and daybreak, of the following day, this enemy force, which depends on neither roads nor bridges, might well evade our best efforts to fix and destroy it within the circle described on the map. The installations shown therein closely approximate the situation as it existed just prior to our invasion of Normandy. Tactical units and Headquarters are not shown. It appears patent that we can no more ignore this small but potent force than could a man who suddenly realized he had a hornet in his trousers ignore that hornet.

We would immediately have to move sizable forces, forces in the process of embarking for an invasion, to protect all vital installations, bridges, communication, and transportation centers as well as headquarters. In addition, we would have to alert all troops within possible striking distance.

Next, we would have to set about to fix and destroy this enemy. Considering his independence of roads and bridges, this would be no small task. In addition to the usual advantages that accrue to the force with both the initiative and mobility, he would have in his favor the fact that forces sent against him would be loath to employ usual aggressive measures in friendly territory. This same condition would almost limit the employment of air forces to a role of reconnaissance.

True, the squadron would have to contend with a hostile civil population. Hence, their movement would continually be opposed and their progress reported. However, judicial and systematic destruction of communications and mining of roads (all part of raiding technique) should go far toward neutralizing the information services spontaneously performed by civilians. Civilian opposition, even considering the Home Guard (good though it was), could hardly do more than harass an organization with such flexibility and cross-country mobility. Hence, it would be necessary to commit a large number of the invasion troops to the mission of locating, fixing, and destroying this squadron.

The eventual outcome of the hunt will not be argued. Certainly the quarry would eventually, and perhaps rather speedily, be brought to bay and smothered. Yet it seems just as logical that before we can corner him, he will have committed considerable and probably serious depredation. However, reflecting upon the closely controlled and clock-like precision of both troop and supply movements so essential during the critical period just preceding and during embarkation for an invasion, it would appear that the greatest damage would grow out of the disruptions and dislocations that his presence would have caused. In fact, we are reminded of Aesop's fable in which the ant bit the hunter on the ankle and disturbed his aim, thereby saving the life of the elephant.

As indicated, this hypothetical operation would eventually come to a bad end. This would be because it lacks the essential element of *mass*—without which all airborne operations eventually become a struggle for existance. Nonetheless, it does illustrate the advantages that accrue to an airborne force when to that force's strategic mobility we add tactical mobility. Mass can be added. If and when it is, logistic support can be provided. We have the means if only we are willing to pay the price.

It is realized that to do so is an expensive proposition, and that both extreme selection and extensive training would be necessary for the establishment of any force capable of exploiting the characteristics portrayed in the example. Yet, would not the results logically expected of them justify their creation within the armed forces of a nation possessed of the material resources capable of their support?

Supplement to "A Cure for Shipside Confusion"

MAJOR FREDERICK R. ROBERTS, *Transportation Corps*

Information contained in this article supplements Lieutenant Colonel Edmond E. Russell's article "A Cure for Shipside Confusion," published in the August 1945 edition of the MILITARY REVIEW, by showing modifications necessary in its application to a specific port with a heavy returning troop movement.—THE EDITOR.

THE article "A Cure for Shipside Confusion" published in the August 1945 issue of MILITARY REVIEW sets forth a guide to cover debarkations at a typical port known hypothetically as the Leavenworth Port of Embarkation.

In the early days of the war all ports had experiences similar to the one outlined, in that 300 passengers were met by an equal number of people eager to welcome and assist in the debarkation. There was confusion. But the days of one large vessel arriving with only 300 passengers and 300 people waiting on the pier to meet it are past. Effective VE-day all Eastcoast ports went into the business of moving men in wholesale lots with no loss of time permitted. Today's problem might best be illustrated by a recent day's arrival at one port. In the span from 0730 to 1330 hours eleven ships arrived. They ranged in size from a small converted Liberty ship carrying 363 men to a large trooper with 8,574 US troops—in all, 29,000 men. These vessels were berthed at nine widely scattered piers. Immediately upon arrival each vessel had to be met and boarded by Port authorities. Hardly any two vessels presented the same problem or required the same assortment of working personnel.

The day's operation involved the movement of thirty-two trains and five large motobus convoys to the Port Staging Areas.

The question arises whether the provisions of the Leavenworth Debarkation Memorandum No. 23, if applied to movements of this nature would serve its purpose of cutting down confusion on the pier. This is extremely important in effecting a speedy and orderly debarkation.

It would accomplish its desired aim in a small ship load as outlined in the original article, but when we are met with a complex problem of a troopship load of from 4,000 to 6,000 passengers in mixed categories, the variations that exist in every job must be considered.

In training personnel in the principles of such operation, consideration must be given to the variations existing in the field and procedure established on a flexible basis that will permit the accomplishment of every debarkation with speed and the minimum of confusion. It is maintaining control of the variations that make for smooth operation in any port and regardless of the harassment factor attendant with such variations they must not be overlooked or slighted in the establishment of operating principles.

Debarkation operations, in any port, require a constant adjustment for these variations. Two shiploads are rarely alike, nor have the same problems aboard. The expected hour of arrival, the pier location, the weather, the physical characteristic of the ship itself, the variations in passenger load, as well as mode of travel from the ship, are all factors that must be considered and coordinated, from the first, in establishing the priorities of debarkation and making out a debarkation schedule that works smoothly.

Let us examine the basic document to see how it would apply to present operations. Debarkation Memorandum 23 indicates that the Troop Movement Officer of the port boards each vessel prior to docking so as to contact the Transport Commander and obtain the Passenger List; advise the Transport Commander the method and order of debarkation. Then when the vessel docks it is provided that a Debarkation Officer will board the vessel, report to the Troop Movement Officer; issue such instructions as may be necessary to accomplish orderly debarkation and control of passengers. Now, to whom

does the Debarkation Officer issue his instructions? The Troop Movement Officer who has already set up the order with the Transport Commander or does he countermand the Troop Movement Officer's instructions and issue new instructions to the Transport Commander?

There is only one Troop Movement Officer in a port. And a port handling multiple arrivals would soon bog down if the debarkation of each ship had to proceed under the direct supervision of the Troop Movement Officer.

The Debarkation Officer is a member of the Troop Movement Division and in the practical operation of most ports is the officer empowered to act for the Troop Movement Officer. He is the officer who boards the vessel prior to docking, who delivers previously prepared debarkation orders and arranges with the Transport Commander for the delivery of troops at the head of the gangplank in Passenger List order and at the time scheduled for departure. The operating check list for the Debarkation Officers covers briefly the duties of the officer. A study of this check list given below will show why, to get his job done, it is necessary for this officer to board the vessel as far in advance of the docking of the vessel as possible.

Check List—Duties Debarkation Officer

1. Deliver the debarkation order to the Transport Commander. Review plan of operations.

2. Give "Welcome Home" talk.

3. Pick up fifteen copies of Passenger List for later distribution by Troop Movement Division.

4. Pick up six copies of Navy roster for Navy Liaison Officer when Navy passengers are carried.

5. Obtain Certificate of Personnel Embarked and last U.S. Port Number (one certificate for each port of call).

6. Obtain names of permanent party (next of kin list).

7. Check with Transport Commander on Senior Unit Commander Reports.

8. Check with Transport Commander on gangplanks to be used for debarkation.

9. At the Transport Commander's Debarkation meeting:

a. Have Transport Commander remind Group Leaders that equipment is not to be abandoned on ship or pier and that there is to be no smoking on ship or pier during debarkation.

b. Have Group Leaders informed by Transport Commander that men will debark in Passenger List order and "sound off" with first name and middle initial when last name is called.

10. Pick up from Transport Commander fifty copies of Group Orders or the dual stencil for the groups and units carried on the vessel.

11. Pick up three copies of orders of casuals.

12. On Liberty Ships check reaction of personnel to type of accommodations, meals, etc.

13. Check reaction of patients to ARC welcome home committee.

14. Check stop list on any military personnel not going through Port Staging Area. Take action indicated on Stop List if person named is aboard vessel.

15. Notify Port Transportation Division representative to inspect baggage of any casual not going to Port Staging Area.

Paragraph 1*a* of Debarkation Memorandum No. 23 provides the boarding party consist of: Troop Movement Officer, Port Surgeon, Enlisted Men Medical (Clerk), Naval Boarding Officer, and Naval Logistical Officer.

The Navy is now less active in debarkation operations and they no longer (in 3d Naval District) desire to be a part of the boarding party unless drafts of Navy personnel are carried as passengers. The nature of the passenger load determines the make-up of the party. Here again the variables enter into the operation. For example, a ship carrying troops returning for redeployment need only consist of the following boarding party: Troop Movement Debarkation Officer and EM Clerk, Medical Officer, and Baggage Officer.

A ship carrying civilian passengers, as well as troops and patients should be boarded by: Debarkation Officer and clerical staff of EM, Medical Officer, Baggage Officer, the entire Intelligence Panel (under FBI supervision), American Red Cross Ship Service Representatives, and such government port authorities as are needed to clear the vessel for immediate debarkation on arrival at the pier.

The Baggage Officer is especially important in that he must get accompanying baggage off the vessel before the men leave the Staging Area for the Reception Station. The sooner he secures the manifests and baggage lists, locates the top priority baggage and arranges with ship authorities to open hatches and rig the booms prior to docking the sooner the baggage will be expedited to its destination.

The other members of the boarding party will be covered in a discussion of the order of debarkation.

Paragraph 1c, *d*, *e*, and *f* prescribe the order of debarkation. The impression is gained that only one category of personnel debark at a time and that the order is for POW's and able bodied military to be taken off before patients and civilians are permitted to debark.

Here again the variations of passenger load becomes the controlling factor in determining the schedule and a hard and fast rule cannot be followed. For example: Prisoners of war usually come off first, as indicated. It is necessary to take them away before the guards can be sent to the Staging Area for processing. But POW movements are direct trainside shipments and if the vessel arrives earlier than indicated in the initial forty-eight hour ETA (expected time of arrival) notification, the POW's must be held on shipboard until the trains are ready to take them away.

The order of debarkation depends somewhat on the physical characteristics of the vessel and the area the troops are billeted in. Has the ship working ports for only one gangplank? If two or more are available then simultaneous operations can be established with able bodied coming off one gangplank and patients off the other. Everyone is happier thus for they are all getting action. Should there be only one gangplank and the hospitals can receive them immediately, then patients get the first priority and they are the first off. Experience has proven the best evacuation order for patients is:

1. Mental cases.
2. Ambulant sick.
3. Litter cases.

The excitement and tension on the vessel at arrival is such that the sooner the mental cases are taken off, the better it is for them. This order also frees the Medical Ships Hospital Platoon attendants so they can assist in the evacuation of litter cases and cleaning up the hospital areas before they themselves debark. After patients come the able bodied.

Paragraph 1*e* of Debarkation Memorandum No. 23 provides that the Intelligence Panel and the Red Cross Representative will board the ship on completion of the debarkation of service personnel on call of the Troop Movement Officer with the duty of interviewing and clearing civilians for debarkation. To operate accordingly would cause a delay in clearing the vessel and greater confusion in the over-all debarkation.

Time controls most operations. The ship must be cleared rapidly so it can be restored and turned around for another load. Hours count as do days in a peace-time operation. The passengers themselves exert pressure that cannot be overlooked. They want to debark when they arrive. They have been overseas long enough. They have been on the vessel and at sea a bit too long. The ship has lost its romance and appeal. The men are back in the States and they want to go home. A fifteen minute delay is resented, by all, way out of proportion to the time lost.

The civilians on the vessel want to debark just as much as do the troops or patients. They may be technicians who have been serving with troops, or merchant seamen who are survivors of a torpedoing, or War Brides

who are coming to a new land, worried and eager to reach a place of safety with their new families.

If the Intelligence Panel does not come aboard until the troops are debarked, a matter sometimes of three or four hours after actual docking, it means the vessel would not be cleared until several hours later. At best it takes approximately four hours to clear one hundred civilians through the panels if their papers are all in proper order. And there have been instances where it has taken several hours to clear two or three civilians and eight hours to clear one hundred and twenty-five civilians. When Panels do not go aboard with the Debarkation Officer, confusion is greater because the civilian, thinking nothing is being done to get him ashore, hounds the Debarkation Officer while he is trying to perform other duties, asking him when he is getting off the ship and a hundred other questions of a personal nature not relevant to their debarkation. Clearing civilians for debarkation can be done with no confusion whatsoever simultaneously with troop debarkation and patient evacuations. The Panels operate in the Officers' Lounge or the first class mess which is always cleared during debarkation. The Panels are in no ones way and the time gained in paneling while the ship is moving into port and during debarkation more than pays for the inconvenience of a slightly larger boarding party.

The Red Cross Ships Service Man is important too. He answers all the personal questions ordinarily asked the Debarkation Officer by the civilians; he handles Red Cross personnel and determines prior to docking the transportation requirements of the civilians he will be responsible for moving when the vessel docks. This enables him to go ashore immediately on docking and to arrange for the additional transportation needed. A saving of several hours, at this time, in arranging the transportation for the one shipment frequently means avoiding a day's delay in port for many of the civilians.

Confusion is easily avoided by making the order of boarding after the ship docks a responsibility of the officer in charge of pier operations. He is the ring master who works out the pier operation. He is the man who knows the variables applying to that particular job. Men wishing to board for business reasons should be required to report to him and state their business prior to the arrival of the ship. He, the Officer in Charge, then arranges for their time of boarding and controls their movements on the pier.

Practical experience has shown that the MP's should board first after docking to take over the fire watch while additional details from the Port Surgeon for the evacuation of patients should be next. The Port Steward who must restore the vessel for the turn around, the Marine Repair Officer, who must handle repairs, the G-2 Officer, the Inspector General, and others from various Port Agencies, all have legitimate reasons for boarding immediately on arrival. Their movement up the gangplank is best controlled by the Officer in Charge on the pier and not by a fixed procedure that does not cover all agencies and all problems.

Throughout the history of the world any ship ever built can be sunk by one means or another. The atomic bomb will undoubtedly sink more ships with one explosion than any previous weapon; it will undoubtedly force dispersion of fleets and marked modifications of tactical and cruising dispositions.

But because armed ships can be sunk it does not necessarily follow that they are obsolete. As long as surface vessels carry the bulk cargoes of the world, there will be need of armed ships to help protect them. It may well be that small, fast, lightly armed surface vessels—and especially submarines—will be important rocket carriers and atomic-bomb launchers in tomorrow's Navy.

Hanson W. Baldwin

The Integrated Air Depot

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Instructor, Command and General Staff School

EVERYBODY realizes the meaning of the word "Snafu" but little does one realize that it must have originated after looking at the organization of some of our early Air Depots.

The Army Air Forces have adopted a program of integration of the various arms and service units into the AAF for several important reasons:

1. A saving of trained personnel.
2. *Esprit de corps* in Air Forces.
3. Increase in the general efficiency of the Army Air Forces as a whole.

Several steps toward this total integration have been made in the adoption of the integrated Air Service Groups and now the integrated Air Depot. The integrated Air Depot has resulted in a reduction of trained officers and enlisted personnel, plus a reduction in the number of component units.

At the present time there are many types of AAF depots, which include:

1. Base Air Depots, located near the ports of debarkation to assemble AAF supplies and equipment for distribution to forward Air Force General Depots and other AF activities.

2. Air Force General Depots, located in the rear areas but close enough to furnish supplies and equipment to the forward combat units through air service groups. These depots are designed to accomplish fourth echelon supply, repair, and reclamation.

3. Air Force Ordnance Ammunition Depots which supply Class V Ordnance Ammunition (AAF) to air service groups or direct to squadron or group airdromes.

4. Air Force Aviation Gasoline and Oil Depots which furnish Class III-A direct to air service groups or to squadron or group airdromes.

During the course of the war, it was often necessary to combine two or more Air Depot Groups and associated units in order to effect:

a. Better utilization of specialists, personnel, and equipment.

b. Reduction in administrative overhead.

c. Greater ease of control and supervision by higher authority.

Basically, the Air Depot Group is designed, manned, and equipped to provide fourth echelon supply, repair, and reclamation in support of four combat groups. Operations are generally of a fixed non-mobile character in a rear area because of the heavy equipment involved. However, experience in the various theaters has shown that the Air Depot Group, as now organized, is too unwieldly, not readily adaptable to merging, and is wasteful in personnel and equipment.

A normal old-type air depot has an organization similar to that shown on Chart No. 1.

After studying Chart No. 1, it is obvious that complications arose even when two or more air depot groups were combined to operate one AF General Depot. In addition to those ASWAAF Units (arms and services associated with the AAF) shown in Chart No. 1, there were many other units which could have been attached to the Air Depot Group if the necessity arose.

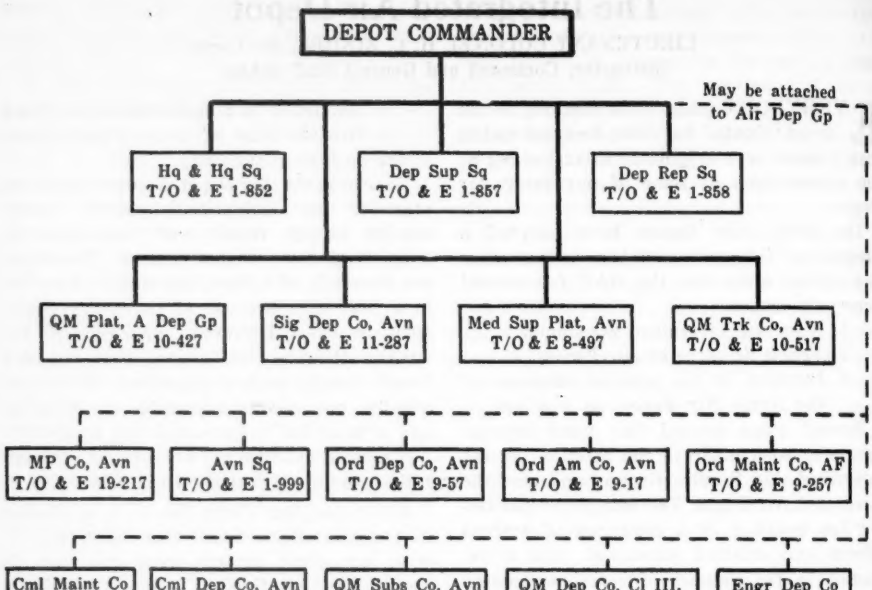
A plan suggested to eliminate and avoid duplication of personnel and equipment, in early 1944, has been approved and published and is the one which will be discussed in the remainder of this article. The various Tables of Organization and Equipment ("R" Series) of the six squadrons in the AAF Depot were published, dated 29 May 1945.

The Integrated Air Depot (Chart No. 2) will provide fourth echelon supply, reclamation, and repair required to support a force of four combat groups and supporting units, with a few minor exceptions, which are as follows:

(1) Overhaul of aircraft engines and certain engine accessories.

(2) Storage and issue of bulk Class III and III-A supplies except for local issue.

(3) Repair of AACS communications equipment.


DEPOT COMMANDER
May be attached to Air Dep Gp
Hq & Hq Sq T/O & E 1-852
Dep Sup Sq T/O & E 1-857
Dep Rep Sq T/O & E 1-858
QM Plat, A Dep Gp T/O & E 10-427
Sig Dep Co, Avn T/O & E 11-287
Med Sup Plat, Avn T/O & E 8-497
QM Trk Co, Avn T/O & E 10-517
MP Co, Avn T/O & E 19-217
Avn Sq T/O & E 1-999
Ord Dep Co, Avn T/O & E 9-57
Ord Am Co, Avn T/O & E 9-17
Ord Maint Co, AF T/O & E 9-257
Cml Maint Co T/O 3-47
Cml Dep Co, Avn T/O 3-418
QM Subs Co, Avn T/O & E 10-477
QM Dep Co, Cl III, Avn T/O & E 10-467
Engr Dep Co T/O & E 5-47

Normal Old Type Air Depot and Associated Units

Chart No. 1.

(4) Impregnating service.
(5) Laundry service.
(6) Disinfestation service.
(7) Refrigeration service.
(8) Graves registration service.
(9) Textile and shoe repair service.
(10) Repair of certain communications equipment such as ground radar reporting equipment, ground radar gunlaying equipment, ground radar beacon and navigational aids, VHF fighter control net systems, special aircraft radio and radar equipment, and AAF instrument approach systems. This work can be performed by the Air Depot if augmented by special teams provided by higher headquarters.
(11) Quartermaster sales services.
(12) Supply and maintenance for Engineer Aviation Battalions.

The integrated air depot commander has three assistants, an Executive for Maintenance, an Executive for Base Services, and an Executive for Matériel.

The Executive for Base Services is charged with the supervision and control of all Air Depot Base Service functions. He is squadron commander of the Base Services Squadron, and in addition, exercises control over the Motor Transport Squadron.

The Headquarters and Base Services Squadron, T/O&E 1-562R provides headquarters and base services activities including finance, fixed communications, chemical, chaplain, medical dispensary, photographic and reproduction services, special services, operations and flight services, interior guard, and internal security. The functions charged to the Headquarters and Base Services Squadron are presently being performed by the following units or sections thereof:

a. Headquarters and Headquarters Squadron, Air Depot Group, T/O&E 1-852.

b. Repair Squadron, T/O&E 1-858.

c. Signal Company, Depot, Aviation, T/O&E 11-287.

d. Military Police Company, Aviation, T/O&E 19-217.

The Motor Transport Squadron, T/O&E 1-988R, provides the personnel and equipment to perform general cargo operations and motor transport service. The capacity of this squadron is 413 tons with trailers and 305 tons without trailers. The functions charged to the Motor Transport Squadron are presently being performed by the two units:

a. Quartermaster Truck Company, T/O &E 10-517.

b. Quartermaster Truck Platoon, Aviation, Sep, T/O&E 10-518.

The Executive for Maintenance is charged with the supervision of all fourth echelon reclamation and repair (with exceptions listed above) which is required to service four combat groups and their supporting units. He is squadron commander of the Air Repair Squadron, and in addition, exercises control over the Air Vehicle Repair Squadron.

The Air Repair Squadron with a T/O&E 1-567R, performs fourth echelon reclamation and repair of all AAF equipment (with exceptions noted above), gas mask and other chemical equipment (except certain chemical special purpose vehicles), weapons and ordnance general equipment (less vehicles), and signal equipment (with exceptions noted above). In addition, it performs third echelon reclamation and repair of the above equipment for units comprising the depot and also provides crash fire and utilities service including structural fire fighting at the depot installations. When authorized by the War Department, the following sections may be provided:

(1) Carbon dioxide generating.
(2) Oxygen generating.
(3) Photographic equipment repair.
(4) Rubber repair.
(5) Central station fire control.

Also included in this Air Repair Squadron is a guide showing the composition of a "Mobile Repair Unit" formed from personnel already provided within the total strength. The functions charged to the Air Repair Squadron are presently being performed by the following units or sections thereof:

a. Headquarters and Headquarters Squadron, Air Depot Group T/O&E 1-852:
Engineering staff section.
Part of Ordnance section.

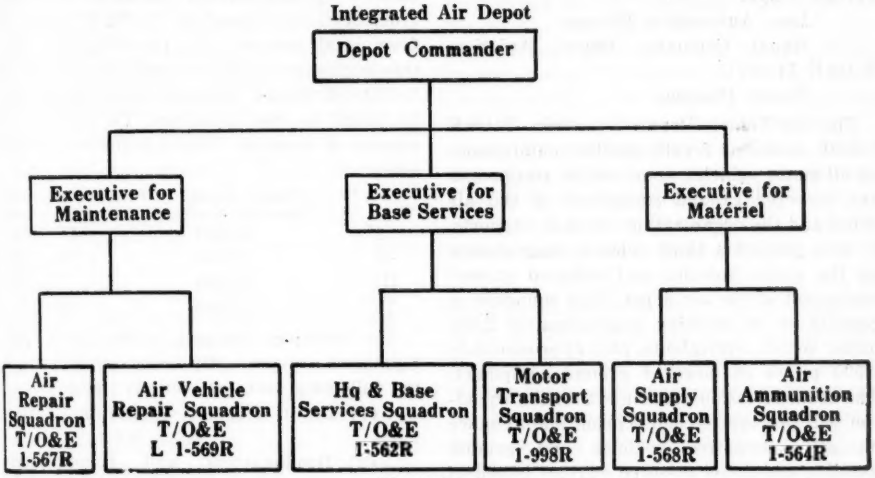

Integrated Air Depot
Depot Commander
Executive for Maintenance
Executive for Base Services
Executive for Matériel
Air Repair Squadron T/O&E 1-567R
Air Vehicle Repair Squadron T/O&E L 1-569R
Hq & Base Services Squadron T/O&E 1-562R
Motor Transport Squadron T/O&E 1-998R
Air Supply Squadron T/O&E 1-568R
Air Ammunition Squadron T/O&E 1-564R

Chart No. 2.

b. Depot Repair Squadron, T/O&E 1-858.

c. Chemical Maintenance Company, T/O&E 3-47:

Gas Mask Repair Platoon.
Equipment Repair Platoon (part).

d. Engineer Service Organization T/O&E 5-500:

Fire Fighting and Utilities Detachment.

e. Ordnance Maintenance Company, T/O&E 9-257:

Less Automotive Platoon.

f. Signal Company, Depot, Aviation, T/O&E 11-287:

Repair Platoon.

The Air Vehicle Repair Squadron, T/O&E 1-569R performs fourth echelon maintenance on all motor vehicles, construction equipment, and powered ground equipment of the air depot and the organization which it supports. It also performs third echelon maintenance on the motor vehicles and powered ground equipment of the air depot. This squadron is capable of maintaining approximately 2,600 motor vehicle equivalents, plus approximately 1,500 pieces of powered ground equipment. The transportation section within the squadron will perform second echelon maintenance on all automotive vehicles and ground gasoline and diesel powered engines issued to unit. The functions charged to the Air Vehicle Repair Squadron are presently being performed by the following units or sections thereof:

a. Chemical Maintenance Company, T/O&E 3-47:

Equipment Repair Platoon.

b. Engineer Maintenance Company, T/O&E 5-157.

c. Ordnance Heavy Automotive Maintenance Company, T/O&E 9-197.

d. Ordnance Maintenance Company, AF T/O&E 9-257.

e. Headquarters and Headquarters Squadron, Air Depot Group, T/O&E 1-852.

The Executive for Matériel is charged with the supervision of all fourth echelon supply (with exceptions previously listed) which is required to support four combat groups and service units. He is the squadron commander of the Air Supply Squadron, and in addition, exercises control over the Air Ammunition Squadron.

The Air Supply Squadron, T/O&E 1-568R furnishes fourth echelon of all supply (except Class III, III-A, and V) to units served by the depot, and all echelons of supply (except Class V) to units of the depot. For efficient operation, this squadron must be augmented by semi-skilled personnel obtained from Aviation Squadron, T/O&E 1-999, or from local sources. For planning purposes, this augmentation will normally consist of 100 to 150 individuals. Intransit Depot Section can be added to this squadron. This section is capable of handling freight indicated in table below:

Type	*Freight handled (tons per month)*	*Personnel augmentation (individuals)*
I	20,000	150-200
II	15,000	100-150
III	10,000	75-125
IV	5,000	50-75

The functions charged to the Air Supply Squadron are presently being performed by the following units or sections thereof:

(1) Depot Supply Squadron, T/O&E 1-858.

(2) Headquarters and Headquarters Squadron, Air Depot Group T/O&E 1-852:

Supply Staff Section
Ordnance Section (part of supply personnel)
Chemical Section (supply personnel)
Quartermaster Section.

(3) Engineer Aviation Depot Company, T/O&E 5-47.

(4) Medical Supply Platoon, T/O&E 8-497.

(5) Ordnance Depot Company, T/O&E 9-57.

(6) Quartermaster Railhead Company, T/O&E 10-197.

(7) Quartermaster Depot Subsistence Company, Aviation, T/O 10-477.

(8) Quartermaster Platoon, Air Depot Group, T/O&E 10-427.

(9) Signal Company Depot, T/O&E 11-287 Storage and Issue Platoon.

The sixth and last squadron of the integrated air depot is the Air Ammunition Squadron, T/O&E 1-564R which receives, stores, and issues all Class V supplies (ordnance and chemical) for the units served by and comprising the air depot. This Table of Organization and Equipment is flexible and the capacity for handling Class V supplies varies when servicing the following combinations of tactical organizations:

Units Serviced	*Tons per day*
4 Bomb groups	800
3 Bomb groups and 1 other	750
2 Bomb groups and 2 others*	700
1 Bomb group and 3 others	600
1 Basic group and 4 others	450

The functions charged to the Air Ammunition Squadron are presently being performed by the following units or sections thereof:

(1) Chemical Depot Company, T/O&E 3-418.

(2) Headquarters and Headquarters Squadron, Air Depot Group, T/O&E 1-852, Part of Ordnance Section.

(3) Ordnance Ammunition Company, T/O&E 9-17.

(4) Ordnance Ammunition Renovating Platoon, T/O&E 9-500.

* Normal Air Ammunition Squadron.

The integrated air depot has a normal total of 2,043 officer and enlisted personnel against a possible total of 2,416 in the present type air depot. Thus, the functionalization has resulted not only in a reduction of 373 officers and enlisted men, but also resolves the number of component units from a possible seventeen to six. As we stated earlier, each of the executives has a dual function, that of being an executive to the depot commander, also acting as the squadron commander of one of the six squadrons with control over another squadron. Thus, the squadron commander is responsible to the depot commander for the activities of his particular squadron so far as they pertain to the installation as a whole. For example, the commander of the Air Supply Squadron supervises all the supply functions of the depot, regardless of the type of supply concerned, such as AAF, Quartermaster, Ordnance, or Signal.

Thus, it can be readily seen that due to the functionalization, the over-all reduction in the number of trained officer and enlisted personnel and the reduction in the number of unit headquarters, the new integrated air depot has become a streamlined organization more capable of performing its assigned mission.

The longer the war lasted the greater the peril that one of the nations on our side might be defeated or become exhausted, the greater the risk that the Germans would finish and put to use some of the new engines of destruction they were known to have in course of development. From these premises it seemed to be the soundest policy to concentrate first on the defeat of Germany, in spite of the clamor in some quarters for us to turn our attention at once to the Pacific. It was also indicated that we must mobilize and get into combat as swiftly as possible and with our utmost strength, with the single resolution of bringing the war to a conclusion with the least possible delay. Delay might spell defeat. Of all wars, a wasting war is the worst. There was no place for a "business as usual" attitude. Temporary sacrifices on the home front would be amply repaid, and morale here would be taken care of by success in battle overseas. I never had a doubt on the wisdom of this strategy. It worked.

Hon. Robert P. Patterson, Secretary of War

The Staff Officer on a Planning Staff

LIEUTENANT COLONEL R. C. WILLIAMS, Jr., *Infantry*

MANY books have been written and countless lectures delivered relative to planning amphibious operations. Every officer who has seen an LST or a DUKW seems to have his own "approved solution" as to how amphibious operations should be carried out. However, when the average staff officer is suddenly confronted with a directive from higher headquarters or his commander which, in a paragraph or two, outlines a contemplated operation and directs that work on plans for this forthcoming task be started immediately, too many times he is in a quandary as to where to begin.

Rather than attempt to present my own personal ideas regarding the organization and functioning of a planning staff I have chosen to discuss the Planning Staff of the JOSS Force which landed at Licata, Sicily, on 10 July 1943. I have selected the JOSS Planning Staff for four reasons: first, because the Force Commander did an excellent job in organizing his planning staff and seeing to it that the staff "stayed on the right track" in its work; second, because it involved working not only with our own Navy and Air but also with the British; third, because the plans proved sound in every respect when executed; and lastly, because I was fortunate enough to have been a member of this Planning Staff and am therefore familiar with its work.

A British officer from the Combined Operations Headquarters, who worked with the JOSS planners, has this to say relative to the planning phase: "The process whereby the JOSS Force Plan was produced, complete, simple, practicable and on time, was so far in advance of anything that I had experienced during the previous two years of uninterrupted planning and mounting of combined operations, that I was left with the impression that a perfect technique had been evolved at last. The planning system adopted by the naval and military commanders of JOSS Force might well serve as a textbook for future operations."

The 3d Infantry Division was undergoing intensive training, including amphibious work, at the Army Invasion Training Center at Arzew, Algeria, when its Commander received a directive from General Patton which stated that he would command a task force charged with the mission of landing on the southwest coast of Sicily in the Sciacca-Castelvetrano area and capturing the airports located in that vicinity. Thus, in a simple paragraph the division commander had a mission which called for planning an operation wherein he would have three times as many troops as he then had. At the same time he had to concern himself with training these troops for the coming task. He therefore established a planning section separate from his staff proper to commence work on the Husky Operation. This separation of staffs was a large factor in contributing to the success of each, for, although close liaison was continuously maintained, the specific problems of training and planning which continually arose were thereby efficiently solved.

The Planning Staff initially was small, comprising a representative from each General Staff Section of the Division and headed by the Assistant Division Commander. A Naval and Airborne representative were soon added.

An "X" and "Y" list were drawn up. Those officers whose names appeared on the "X" list were to be informed of the Operation in its entirety while those who were on the "Y" list were to be acquainted with all of the Operation except the Target and Landing Date. As D-day approached these lists were changed, more and more names being transferred from the "Y" to the "X" list. However, initially, besides the Planning Staff the "X" list included the Chief of Staff, Artillery Commander, G-1, G-2, G-3, G-4, Division Quartermaster, Division Surgeon, Ordnance Officer, Division Engineer, and the Division Artillery Executive Officer. The "Y" list consisted of the RCT [Regimental Combat Team] Commanders, Separate Unit Commanders and the assistants to the Division General Staff Officers. A hospital tent was erected in the Division Command Post Area,

a barbed wire fence put up around it, a military police guard organized, and the JOSS Planning Staff was ready to go to work.

Here, then, was the time when the Staff Officer on the Planning Staff had to make some decisions. First, he had to decide what he had to do. Next, he had to decide what he needed. Third, he had to decide upon a logical time-table for the accomplishment of his tasks. Actually, the members of the Staff were at a loss as to where to begin. When the General appeared in the Planning Tent the first evening, sat down and asked to be shown what had been accomplished by the Planning Staff that day, the G-3 member of the Staff launched into a discussion of a tentative tactical plan, using colored chalk on the map to show the beachhead limits, the landing points of the various RCT's, and the drop zones for the airborne troops. To put it mildly, he was "interrupted" in the middle of his chalk talk by the Division Commander who then outlined what he believed the Planning Staff had to do. He divided his outline into four phases.

First, he stated that he wished to know as much as possible about the coastline of Sicily in the JOSS sector up to the high water mark. By this he meant false reefs fathom lines, underwater obstacles, minefields, and how close to shore each type of landing craft could approach at all possible beaches. This required the planners to exhaust every means at their disposal to secure the necessary intelligence.

After the Force Commander had satisfied himself that the planners had secured sufficient information relative to his first phase requirement to permit it, he stated that he would direct them to commence work on the second phase. This phase, as the Commander envisaged it, required the gathering of all available data regarding the beaches themselves. This data, he said, was to include information as to the nature of the beaches, their length, width, exits, suitability for vehicles and tanks, natural and man-made obstacles, and fixed defenses.

The third requirement consisted of making a thorough and detailed terrain study of the entire southwestern portion of Sicily from the beaches inland to and beyond the objectives. This terrain study was to be complemented by a study of the communications facilities, roads, railroads, bridges, tunnels, ports, towns, and airfields in our sector.

The fourth problem to be solved by the planners, said the Force Commander, was the securing of intelligence concerning the enemy and his defenses. The General emphasized the necessity for details, in this regard, and to illustrate his point he stated that if it were at all posible he wanted to know the location, size, and armament of each and every pillbox in the area. The study should first embrace the local defenses, second, the general defenses, and third, the capabilities of the enemy with respect to his local and strategic reserves.

This outline given the planning staff proved to be the key to the success of the entire planning phase. The plan was remarkably simple and based on pure common sense, starting as it did with the amphibious phase, next the beaches, then inland to the objectives. The planners could see their task clearly now, but the General made a concluding remark that, at that time, nobody on the planning staff believed. He stated that it was his conviction that if the planners did a good job in securing the intelligence relative to the beach approaches, the beaches themselves, the terrain, the communication facilities, the defenses, and the enemy capabilities, and analyzed this intelligence properly in view of the mission of the Task Force, that the logical tactical plan to be employed would unfold itself and be so apparent that the planners would not be bothered about which of many possible tactical plans should be employed. This statement was proven entirely correct in the later phases of the planning period.

Some officers are of the opinion that there is no "rule of thumb" for planning an amphibious operation, yet if the planners were to follow the outline discussed by the JOSS Force Commander, they would at least have a logical starting point in their tasks. It is simple, yet in my opinion, flexible enough to be applied to any operation.

In the case of the JOSS planners, the staff was now oriented. They knew what was expected and so they plunged into the task. First, a list was drawn up of all possible sources of intelligence. Then the task of securing this intelligence was divided among the planning staff. The G-2, for example, in conjunction with the naval representative, began a study of the false reefs along the coast, fathom lines, underwater obstacles, and possible minefields. The Naval officer began a study of how close to shore the various craft could proceed. These studies were based on British Intelligence Summaries, aerial photos, and other data received from higher headquarters. The search for intelligence was difficult and in some instances necessitated a great deal of initiative.

For example, the G-2 soon was aware of the paucity of aerial photos as well as the complete absence of large scale coverage. This obstacle to the progress of the planning staff was overcome by photo coverage by the Air Force. The result was very gratifying in that the G-2 was able to telephone his daily request to Constantine, Algeria, by 1400 on one day, and receive the requested photos by 0900 the following morning. When it is realized that the request had to be relayed to Malta, the mission flown by the British, the pictures printed and flown back to Constantine and from there to the planners, certainly everyone will agree that the service provided was excellent.

In the search for data relating to false reefs and gradients as well as the composition of the beaches themselves the G-2 ran into an apparently solid wall barring his progress. This obstacle also was removed by our British friends, this time by the British Navy. When the full story is published as to how the British submarine people made many attempts to land Naval officers on the proposed beaches—and the officers had to swim ashore fully clothed in the event they were captured to prevent their being shot as spies—before they were successful in bringing back the vitally needed information, all of us will be grateful to these as yet unsung heroes of our ally.

As the work progressed the G-2 plotted the intelligence data on his maps. This included beach data as well as enemy defenses and dispositions. Another example to show the lengths to which the G-2 went in his search for information was the "case of the penny postcard." The problem of the moment was to find out whether a certain beach would take vehicles. In rummaging through some travel folders and postcards picked up by the General in a pre-war trip to Italy, the G-2 came across a picture card showing the exact beach in question. The picture, besides showing the usual sprawled bathers, beach umbrellas, and refreshment stands, showed a civilian car parked on the beach proper.

The G-3 worked on the major portion of the second phase of the outlined task, and with the Naval representative, made a study of the beaches, their suitability for vehicles and tanks, exists, and proximity to roads and to the objectives. The G-2 worked on the beach defenses. The Engineer continued his study of the terrain, aided by the G-2.

Shortly after 1 May, a new directive was received by the Force Commander. This directive changed the time and place of landing from D+2 at Sciacca and Castelvetrano to D-day at Licata. The planning staff immediately instituted a new study of the Licata area similar to the one made for the southwestern area of Sicily. The directive included a more complete but still tentative troop list and craft assignment table and deleted the airborne troops.

When the planners were in the midst of the fourth phase of the outline the skeleton of their efforts was continually being added to and altered to keep their intelligence accurate and up to date. The daily routine of the planners was not varied. Work began about 0730 each morning every day of the week. After supper at 1930, the General, accompanied by his Chief of Staff and other Division Staff members, would come into the planning tent, seat himself in front of the map boards, and the recitations would begin. First of all, the G-2 would discuss all the data available concerning the beaches. Next, he would present the terrain study and finally

would discuss the enemy defenses and troop dispositions, including the enemy capabilities. When he had finished, a general discussion took place, questions, comments, and criticism entertained. The G-3 would then discuss the results of his efforts, followed in turn by the G-4. The Naval representative, the engineer, and any other officer present was given the opportunity to take part. The Force Commander would wind up the meeting, which usually lasted until 0130 or 0200 by presenting his views, comments, and suggestions.

These evening meetings were invaluable in three respects. First, the Divisions Staff, as well as the Commander, were constantly in touch with and up to date on the activities of the planning staff. Also, the planners received much in the way of constructive criticism and advice from the Division Staff. Third, it enabled the Division Staff to insure itself that current training, supply requests, and similar projects were in harmony with the plans for the forthcoming operation.

When the Force Commander had decided that the planners had developed sufficient groundwork he presented them with his first estimate and directive. This directive dealt with methods rather than plans and served as the second basis for the work of the planning staff. It was as follows:

"I may land at one or on all of the four beaches in the Licata area; but in any event my first consideration is the very rapid capture of the three vital key terrain features, all five to ten miles inland from the beaches. The keynote is therefore speed and momentum, and the key to speed is simplicity—particularly in the Naval plan. I want all the infantry of my division ashore within sixty to seventy minutes of the assault. I shall want some tanks landed at the same time, but I shall retain in floating reserve a powerful armored reserve including armored infantry who must be prepared to fight on their feet without armor or vehicles. This reserve will be landed as rapidly as possible to exploit success wherever it is obtained by the initial assault, and as soon as it is apparent. Provided I can do this, I may have to accept the complete failure of one, or even more, of my landings.

"In each RCT one infantry battalion with engineer elements incorporated is being trained to assault, and fight until daylight, in the actual detachments in which they are put ashore from landing craft. Their job will be the engagement of beach defenses: each detachment comprising the infantry and engineers carried in a single LCV, will work like a hound, one of a pack of hounds, hunting out beach defenses and keeping the enemy occupied while the remaining infantry battalions, by-passing resistance, penetrate inland to seize and consolidate the key areas I have indicated. RCT's will retain no reserves afloat, their job is to get inland with the utmost speed and thereafter to patrol forward with vigor in readiness to continue their advance."

The Task Force Commander supplemented the directive with a general plan for the priority of landing vehicles, making it possible for the planners to commence work on the essential technical studies.

On 21 May, the small planning staff was augmented by the S-3's from the three infantry regiments, the Division Artillery, the Antiaircraft Group, Chemical Weapons Battalion, the Executive Officer of the Beach Group, and other unit representatives. An aerial photo interpreter was borrowed from the Air Force. Requests for an air member for the planning staff had met with failure.

The G-3 planner began work on the assault lift. In order to proceed logically the Navy and Army representatives got together on an estimate of the best amphibious means of implementing the Task Force Commander's ideas, as well as an estimate of the technical limitations that would necessarily be imposed, such as characteristics of craft, state of training of crews, navigational hazards, meteorological conditions, beach gradients, nature of the beaches and their defenses and exits.

The G-3 and G-4 made a joint study of the following questions: "What should the

composition of the JOSS Force be, considering the troops made available by General Patton, the limitations of carrying capacity of the landing craft as against the tactical problem involved, and the requirements for maintenance set up for a thirty day period?"

It was decided by the planners, and approved by the Force Commander, that all the Loading and Landing Tables would be prepared by the planning staff. This decision was reached after it was seen that much valuable time would be saved, both the Army and Navy would have a hand in the preparation, the Naval Plan would then be much more simple, and, as the S-3's of the subordinate commanders were now working with the planners it was felt that the interests of the subordinate units would be protected.

On 12 June the planning staff moved from Jemmapes to Bizerte. The G-4, with his assistants, was responsible for the concentration of the Force, 45,000 odd troops, around Ferryville, its maintenance work, the loading of all convoys including the assault, the establishment of a nearshore base and the composition of the follow-up convoys.

The G-3 faced the problem as to what should be the scale of transportation and personnel, not only of combat units but also of the service units, considering craft assigned and craft capacity as opposed by the desire of all units to operate at T/BA [Table of Basic Allowance] and T/O [Table of Organization] standards. This was accomplished by studying the T/BA and T/O of each of the separate units involved, then making up a list of assault transportation by reducing the number of maintenance, kitchen, and supply vehicles.

The Navy member of the planners directed his efforts to investigating the methods to be used in unloading the landing craft, inasmuch as the craft were designed for use in much deeper beach gradients than those encountered in the operation. It must be remembered that, up to this time, no successful means of unloading the LST other than by the use of the LCM in a ferrying capacity had been accomplished in combat. No LCI, up to this time, had been beached to the point where troops could disembark directly. Ponton tests, for example, was just one of the many tests conducted.

The estimates and studies by the engineer planner also became more concrete as the intelligence kept coming in. His terrain study, his data on the port, the bridges, roads, and town of Licata was continually taking shape. Unmarked sketches, showing the beaches and terrain were issued to subordinate commands. All information which would be of value was disseminated unless it jeopardized security.

The work had now reached the stage where it was necessary to merge the Division Staff into the Planning Staff, resulting in the Task Force Staff. The tactical plan was approved, the administrative and logistical plans jelled, and the work of the planners as such was at an end.

That the planners were successful in their efforts was due to several factors. The Commander had provided a logical course of action and, at the proper time, supplemented it with a directive. Planning and training were divided as far as staffs were concerned but coordinated by the evening meetings. Cooperation by the Navy left nothing to be desired. Lastly, the inspiration to the planners provided by the Commander in their efforts to get the intelligence, evaluate it, and then use it saved much valuable time and trouble.

In conclusion, I would like to quote General Truscott, who had this to say:

"Looking back on the JOSS Operation, I would say that the outstanding factor in the success that attended the operation was the complete cooperation between the Army and the Navy elements concerned. This cooperation resulted from close association together, knowledge of each others' problems and willingness at all times to help each other."

Twice in World Wars, we gained the time to prepare from the fighting of our allies. Almost certainly we will never again get the same chance.

Hon. Robert P. Patterson, Secretary of War

The Capture of the Remagen Bridge

CAPTAIN ALBERT B. LANDIS, *Cavalry*
Public Relations Officer, III Corps

THE III Corps continued its rapid advance of the preceding day and drove from five to twelve miles along its entire front to seize the railroad bridge across the Rhine River at Remagen, as well as a number of crossings over the Ahr River in the vicinity of Sinzig, Bad Neuenahr, Heimersheim and Ahrweiler. On this day, enemy resistance appeared to collapse and opposition was scattered, with no apparent organized lines of defense. The little resistance encountered was confined to towns, where small groups defended with small-arms fire, although Heimersheim and Bad Neuenahr the enemy defended stubbornly.

At 1400 the Corps was assigned a new mission as had been anticipated, when Major General W. B. Kean, Chief of Staff, First United States Army, visited the Corps command post with instructions directing the Corps to advance south along the west of the Rhine and effect a junction with the 4th Armored Division (Third United States Army), which was driving north toward the Rhine at a point only a few miles south of the Corps right flank. At this time no actual plans had been made for a crossing of the Rhine at Remagen, and it was not until the news of the seizure of the bridge had been received by Army that this Corps mission to the south was canceled. The actual message canceling the mission was received at Corps Headquarters at approximately 1845 when G-3, in a telephone message, directed that Corps seize crossings on the Ahr River, but that it not move south of the road: Hesseling — Staffel → Ramersbach — Honigsfeld, except on Army order. A second telephone call from Army at approximately 2015 informed Corps that it had been relieved of its mission to the south, and that the Corps was to secure its bridges over the Ahr River, where it would be relieved as soon as possible by elements of the 2d Infantry Division (V Corps).

At the time of receipt of these instructions, all four divisions comprising the Corps were attacking in accordance with prevailing instructions. In the north of the Corps zone, elements of the 1st Infantry Division attacked to the east early in the morning and captured Bruhl, while other elements attacked and captured Berzdorf, Sechten, Barheim and Roisdorf, thus placing the division from two to three kilometers west of the river. It was planned that the 18th Infantry Regiment would pass through the 60th Infantry Regiment (9th Infantry Division) to attack Bonn, and two division commanders made the arrangements necessary for the operation. In the zone of the 9th Infantry Division the 60th Infantry Regiment attacked in the direction of Bonn, while the 39th Infantry Regiment continued to attack toward Bad Godesburg. By midnight, after advances of several miles, elements were in position to attack Bad Godesberg and the objective to the south along the Rhine. At 1430 the boundary between the 9th Infantry Division and the 9th Armored Division as shown in operations directive No. 9, became effective. To the south, in the zone of the 78th Infantry Division the 309th Infantry Regiment attacked through the 311th Infantry Regiment, advanced from eight to ten miles against light resistance, and seized crossings over the Ahr River so that the Corps right flank now lay on and across the Ahr, from the point where the Corps boundary joined the river to the Rhine.

The 9th Armored Division, having been given the mission of seizing Remagen and crossing over the Ahr, moved out in the morning with CCA (Combat Command A) on the right and CCB (Combat Command B) on the left. The mission of CCA was to seize crossings at Bad Neuenahr and Heimersheim while CCB was to take Remagen and Kripp and seize crossings over the Ahr at Sinzig and Bodendorf. CCB consequently attacked in two columns, one in the direction of each of its objectives. Although CCA met stiff opposition at Bad Neuenahr, CCB met practically none and by late afternoon had

captured Remagen, against light opposition. Upon finding the bridge at Remagen intact, the CO, 14th Tank Battalion, who had received instructions from Brigadier General Hoge to seize the bridge should the opportunity present itself, sent infantry and engineer elements of his command to the east side of the river. Although the enemy had prepared the bridge for demolitions, only two small charges (or perhaps two detonators) were fired, and the bulk of the explosives failed to go off. Superficial damage was caused, and planking which the enemy had laid across the railroad tracks was splintered, but structurally the bridge remained intact, although suitable for one way traffic only. One company was sent across the river initially, and by midnight the entire 27th AIB (Armored Infantry Battalion), supported by tanks, had crossed.

First news of the seizure of the bridge arrived at the Corps Command Post at approximately 1700 when the Chief of Staff received a telephone message from the Chief of Staff, 9th Armored Division. He was informed that the bridge had been taken intact, and was asked for instructions. At that time the Corps Commander was at the Command Post of the 78th Division. Instructions were issued the 9th Armored Division to exploit the bridgehead as far as possible but to hold Sinzig. The information was relayed to the Corps Commander, who confirmed these instructions and immediately made plans to motorize the 47th Infantry Regiment (9th Infantry Division) and dispatched it to Remagen. The General then alerted RCT (Regimental Combat Team) 311 of the 78th Division for movement to the bridgehead. Elements of all divisions attached to Corps were moved to the bridgehead as they became available, and in order to achieve effective control and unity of command, the Corps Commander decided to attach all units, initially as they crossed the river, to CCB, 9th Armored Division, thus making General Hoge, CG of CCB, his agent and in a sense, assistant Corps Commander east of the river.

The capture of Remagen bridge was not an accident with the III Corps. The Corps Commander on the night of 6 March 1945, called the Commanding General of the 9th Armored Division on the telephone and said in substance: "Do you see that little black line at Remagen? If you happen to get that, your name will go down in glory."

This proves belatedly that it was not an accident, but rather the foresight of a commander, due to simple standing operation procedure. The plan from higher headquarters had directed the clearing of the enemy from the west bank of the Rhine River only. That day Corps advanced south along the River with CCB—9th Armored Division leading on the left. Corps artillery was directed by the Corps Commander to use time fuze only on the Rhine bridges, for destruction and to concentrate on the approaches. Although it was known that the enemy would blow, or attempt to blow, these bridges, it was hoped that one might be seized and the Corps Commander instructed the Commanding General of the 9th Armored Division to attack aggressively in an effort to seize the Ahr River bridges and the Rhine River bridge intact.

Much as we desire general disarmament and much as we are prepared to participate in a general reduction of armaments, we cannot be faithful to our obligations to ourselves and to the world if we alone disarm.

While it is not in accord with our traditions to maintain a large professional standing army, we must be able and ready to provide armed contingents that may be required on short notice. We must also have a trained citizenry able and ready to supplement those armed contingents without unnecessarily prolonged training.

That is why in the interest of peace we cannot allow our military establishment to be reduced below the point required to maintain a position commensurate with our responsibilities, and that is why we must have some form of universal military training. *Hon. James F. Byrnes, Secretary of State*

The Air Logistics Line-Up

United States Army Air Forces—Japanese Army Air Forces

LIEUTENANT COLONEL HARRY R. PAGE, *Air Corps*
Instructor, Command and General Staff School

This article has been prepared from a study of the limited information available on Japanese Army Air Force logistics. Translated enemy documents and related material from Allied sources have been combined in an effort to trace the air-logistics organization. Where necessary, in order to achieve continuity, voids in available material have been filled by assumptions on the part of the author.—THE AUTHOR.

DAILY throughout the war, first only individual planes over some Pacific island or isolated airstrip deep in China, and later fleets of combat aircraft over Tokyo itself, Japanese Army Air Force and United States Army Air Force fought it out. The planes and their crews were part of the sky battle, and so were the mechanics who tuned up those engines, the war plant workers who drove those thousands of rivets, and the designers who first roughly sketched those planes on their drafting boards.

The aircraft mechanic, the war plant worker, and the designer are all a part of air-logistics, the functions which they and their co-workers perform follow a logical sequence: Research and experimentation, engineering, determination of requirements, contracting and procurement, production, inspection and acceptance, flight and service testing, storage and distribution, maintenance, and recovery and salvage.

Others in the air-logistics field have less technical, but no less important, jobs to do: Air base construction, air base services, quartering, messing, clothing and transportation.

Any military machine desiring to place aircraft in combat must provide for the efficient accomplishment of the functions we have just listed. Using our own air force as a basis of comparison with which many of us are familiar, we can study and analyze Japanese air-logistics organization and procedure. In so doing, we might arrive at a better understanding of our own system.

Let us begin at the top, in air force headquarters, and work on down; comparing as we go, the parallel units in the two systems.

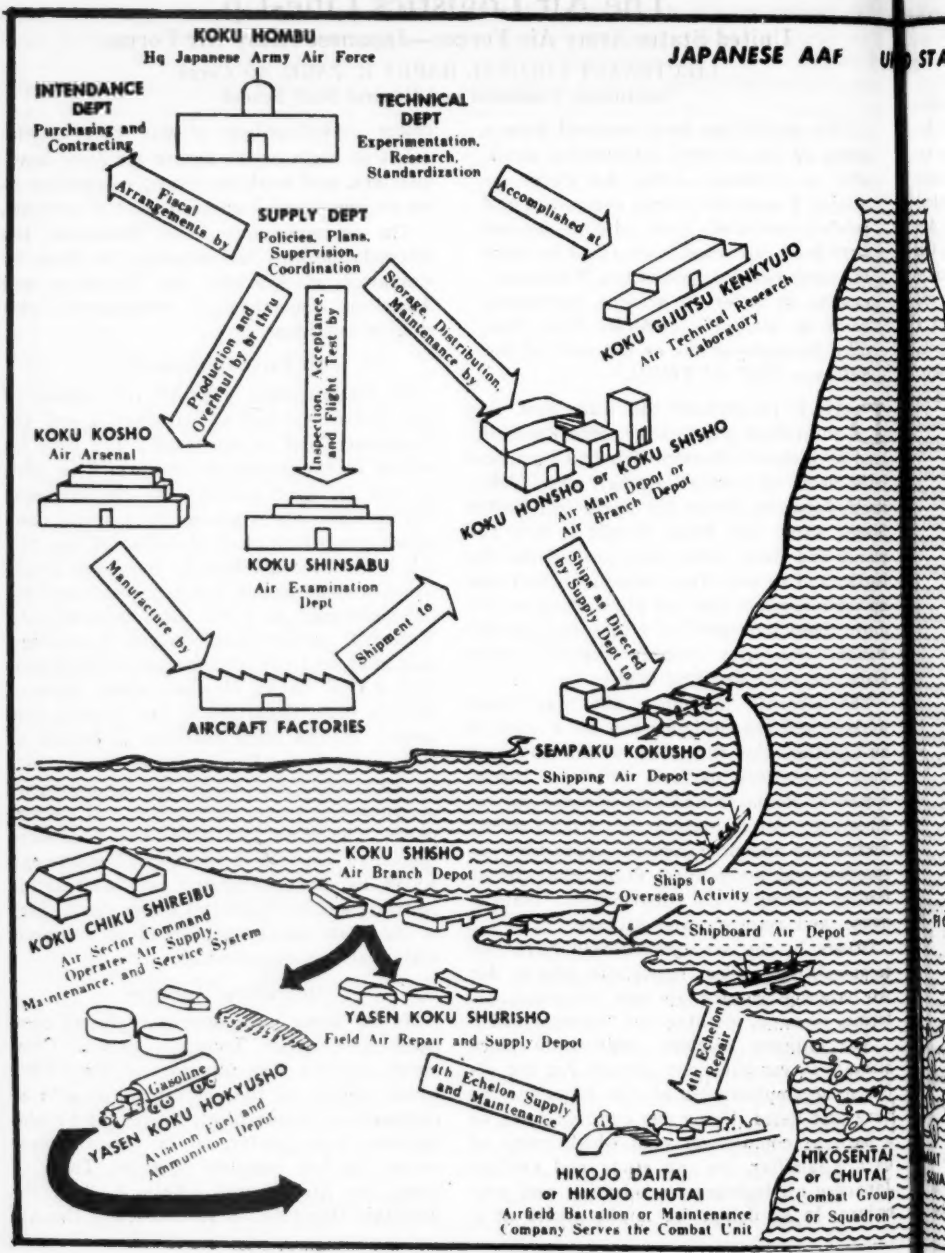
The accompanying sketch illustrates the interrelationships and attempts to show, by similarity of symbols, the Japanese and American commands or installations with similar missions.

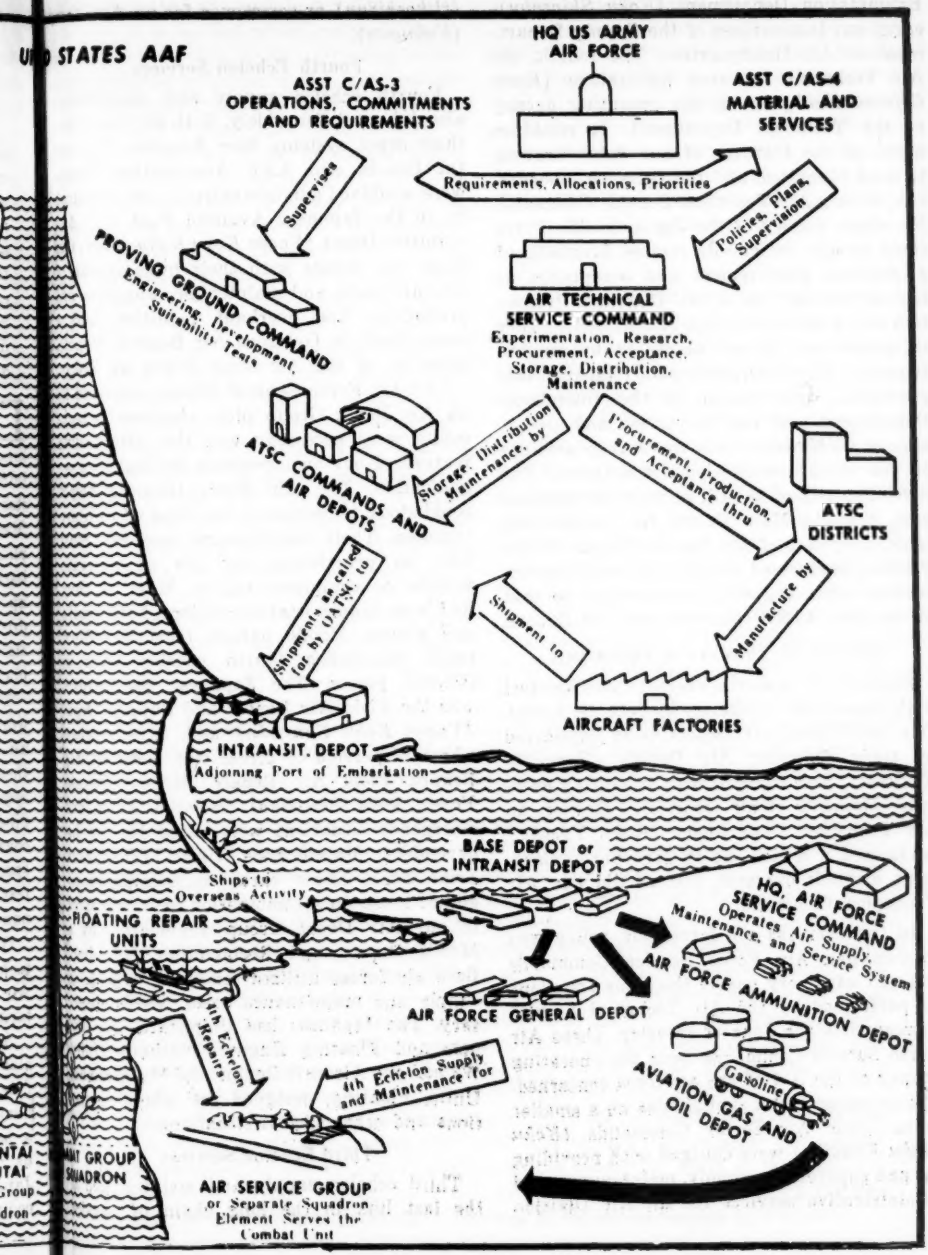
Air Force Headquarters

At Headquarters USAAF, the offices of the Assistant Chief of Air Staff-4 and the Assistant Chief of Air Staff-3 are both involved in the logistical network. The office of the AC/AS-3 through its Requirements Division develops requirements, priorities and allocations which go to the office of the AC/AS-4 for accomplishment. Here are established and developed logistics plans and policies designed to fulfill these requirements. Two staff sections are involved, a considerably simpler arrangement than at Headquarters, JAAF (*Koku Hombu*) where three of the six main departments are directly concerned in the same matters. Principal of these three is the Supply Department, which is responsible for plans for procurement, acceptance, storage, distribution and maintenance. The other two headquarters sections concerned are the Intendance Department, which handles purchasing and contracting matters; and the Technical Department which is the staff agency concerned in research, design and standardization.

Operational Agencies

No one operational agency in Japan compares to our Air Technical Service Command (ATSC). The functions of the ATSC, which include all the operational aspects of engineering, procurement, supply, and maintenance, were performed in the Japanese system by four separate agencies. Three of these, the Air Arsenal (*Koku Kosho*), the Air Main Depot (*Koku Honsho*), and the Air


KOKU HOMBU
Hq Japanese Army Air Force
JAPANESE AAF
INTENDANCE DEPT
Purchasing and Contracting
TECHNICAL DEPT
Experimentation, Research, Standardization
Fiscal Arrangements by
SUPPLY DEPT
Policies, Plans, Supervision, Coordination
Accomplished at
KOKU GIJUTSU KENKYUJO
Air Technical Research Laboratory
Production and Overhaul by or thru
Inspection, Acceptance, and Flight Test by
Storage, Distribution, Maintenance by
KOKU KOSHO
Air Arsenal
KOKU HONSHO or KOKU SHISHO
Air Main Depot or Air Branch Depot
KOKU SHINSABU
Air Examination Dept
Manufacture by
Shipment to
Ships as Directed by Supply Dept to
AIRCRAFT FACTORIES
SEMPAKU KOKUSHO
Shipping Air Depot
KOKU SHISHO
Air Branch Depot
Ships to Overseas Activity
Shipboard Air Depot
KOKU CHIKU SHIREIBU
Air Sector Command
Operates Air Supply, Maintenance, and Service System
YASEN KOKU SHURISHO
Field Air Repair and Supply Depot
4th Echelon Repair
Gasoline
YASEN KOKU HOKYUSHO
Aviation Fuel and Ammunition Depot
4th Echelon Supply and Maintenance
HIKOJO DAITAI
or HIKOJO CHUTAI
Airfield Battalion or Maintenance Company Serves the Combat Unit
HIKOSENTAI
or CHUTAI
Combat Group or Squadron


UNITED STATES AAF
HQ US ARMY AIR FORCE
ASST C/AS-3 OPERATIONS, COMMITMENTS AND REQUIREMENTS
ASST C/AS-4 MATERIAL AND SERVICES
Supervises
Requirements, Allocations, Priorities
Policies, Plans, Supervision
PROVING GROUND COMMAND
Engineering, Development, Suitability Tests
AIR TECHNICAL SERVICE COMMAND
Experimentation, Research, Procurement, Acceptance, Storage, Distribution, Maintenance
ATSC COMMANDS AND AIR DEPOTS
Storage, Distribution, Maintenance, by
Procurement, Production, and Acceptance thru
ATSC DISTRICTS
Shipments as called for by (AAF) to
Shipment to
Manufacture by
AIRCRAFT FACTORIES
INTRANSIT DEPOT
Adjoining Port of Embarkation
BASE DEPOT or INTRANSIT DEPOT
Ships to Overseas Activity
FLOATING REPAIR UNITS
HQ, AIR FORCE SERVICE COMMAND
Operates Air Supply, Maintenance, and Service System
AIR FORCE AMMUNITION DEPOT
AIR FORCE GENERAL DEPOT
4th Echelon Repairs
4th Echelon Supply and Maintenance for
Gasoline
AVIATION GAS AND OIL DEPOT
AIR SERVICE GROUP or Separate Squadron Element Serves the Combat Unit

Examination Department (*Koku Shinsabu*), carry out instructions of the Supply Department in Air Headquarters. The fourth, the Air Technical Research Laboratory (*Koku Gijutsu Kenkyujo*) is the operating agency of the Technical Department. It combines many of the features of our AAF Proving Ground Command and the research laboratories of our Air Technical Service Command. No single agency of the Japanese Air Force could handle the closely related functions of production, procurement and acceptance as is done through our ATSC Districts. Production was a function of the Air Arsenal, either in government owned plants or by civilian factories. Fiscal arrangements related to this production were made by the Intendance Department and final inspection and acceptance of the finished item was a responsibility of the Air Examination Department. The item then passed to still another autonomous unit, the Air Main Depot, for storage and issue. A system of Air Branch Depots (*Koku Shisho*) performed supply and maintenance services on a regional basis similar to that of our own ATS Commands and Air Depots.

Agencies in Theaters of Operations

Shipment of material overseas was handled with remarkable similarity by both air forces. Our AAF Intransit Depots were duplicated by their Shipping Air Depots (*Sempaku Kokusho*), both charged with expediting overseas shipments of air material. Likewise, an Air Transport Department (*Koku Yusobu*) performed a major job in ferrying replacement aircraft overseas just as did our Air Transport Command.

In the overseas air force, our policy was to establish Air Force Service Commands charged with very nearly the same functions as performed by the Air Technical Service Command in the Zone of Interior. These Air Force Service Commands were the operating agency of the A-4 of the air force concerned. The Japanese had a similar idea on a smaller scale. Their Air Sector Commands (*Koku Chiku Shireibu*) were charged with providing for and supervising, supply, maintenance, and administrative services for an Air Division (*Hikoshidan*) or sometimes for an Air Army (*Kokugun*).

Fourth Echelon Services

Fourth echelon supply and maintenance also did not differ widely. Both air forces had their depot systems. Our Aviation Gas and Oil Depots and AAF Ammunition Depots were combined administratively, not physically, in the Japanese Aviation Fuel and Ammunition Depot (*Yasen Koku Kokyusho*). Our Base Air Depots with their huge stocks of aircraft parts and maintenance supplies and production line overhaul facilities had a counterpart in Overseas Air Branch Depots, branches of the Air Main Depot at Tokyo.

The Air Force General Depot, operated by an Air Depot Group plus whatever attachments were necessary was the outstanding feature of our own overseas air-logistics organization. The Air Force General Depot could stock, if necessary, any type of military supplies. Their maintenance sections could take on practically any job of aircraft, vehicle, or equipment repair. Most of them had large transportation sections, both trucks and planes. Mobile parties from the depot could accomplish fourth echelon jobs in isolated places. The Japanese counterpart was the Field Air Repair and Supply Depot (*Yasen Koku Shurisho*) and, in situations where dispersion of forces was dictated, the Branch Field Air Repair Depot (*Bunsho Yasen Koku Shurisho*). Isolated units and emergency situations were cared for by Independent Maintenance Units (*Dokuritsu Seibi Tai*). These three organizations together made up a combination best compared to our Air Depot Group augmented by a Mobile Repair and Reclamation Squadron. Both air forces utilized sea-going vessels as supply and maintenance bases where necessary. The Japanese had Shipboard Air Depots and Floating Engine Overhaul Units. We had our Aircraft Repair and Maintenance Units, Floating, designed for island operations and other special situations.

Third Echelon Services

Third echelon supply and maintenance is the last link in the long chain of service

which originated way back in Air Force Headquarters. It is the link which connects directly to the combat unit. In fact, often the supply and maintenance functions of a third echelon service organization are so closely interwoven with the second and first echelon work of the combat unit as to be indistinguishable. Our third echelon air organization is the Air Service Group, appearing in any one of three forms as the situation dictates. We may employ one type of Service Group which is designed to serve two combat groups operating on any number of airfields. We also have a more streamlined Service Group designed to serve one combat group operating from a single large airdrome. The third form which may be encountered would consist of detachments of either type of group operating with separate combat squadrons. The Japanese parallel of the service group is the Airfield Battalion (*Hikojo Daitai*), which is somewhat larger than its counterpart in the USAAF, accounted for by the fact that the airfield battalion provides more extensive services for the combat unit. The third echelon functions of the airfield battalion are combined with the second and first echelon functions of the air regiment even more than in our own air force. In the same manner in which our service group can be split to serve individual combat squadrons, the Japanese Airfield Battalion may operate as Airfield Maintenance Companies (*Hikojo Chutai*). Special situations calling for third echelon maintenance at an isolated airfield were handled by Mobile Air Repair Sections (*Ido Koku Shurihan*) which can best be compared to our mobile repair units sent out by Air Service Groups.

What conclusions can be drawn from this comparison? Organizational weakness on the part of the enemy could not be one of them. With but minor exceptions the two organizations are identical. The Japanese lack of a single agency to handle engineering, procurement, supply, and maintenance might be considered a shortcoming. Until a few months ago we ourselves had two separate commands charged with these same functions. Other differences were minor, both air forces were striving to attain the same goal; an organization designed to fulfill a logistical mission. The mission was the same in each case, it logically followed that the organization developed to fulfill that mission should likewise be the same.

The appearance of an unusually effective enemy weapon, or of a particularly attractive item of enemy equipment usually provoked animated public discussion in this country, especially when stimulated by criticism of the Army's supposed failures to provide the best. Such incidents posed a very difficult problem for the War Department. In the first place, the morale of the fighting man is a matter of primary importance. To destroy his confidence in his weapons or in the higher command is the constant and intense desire of the enemy. The American soldier has a very active imagination and usually, at least for the time being, covets anything new and is inclined to endow the death-dealing weapons of the enemy with extraordinary qualities since any weapon seems much more formidable to the man receiving its fire than to the man delivering it. If given slight encouragement, the reaction can be fatal to the success of our forces. Commanders must always make every effort to show their men how to make better, more effective use of what they have. The technique of handling a weapon can often be made more devastating than the power of the weapon itself. This was best illustrated by the correct, the intended, tactical employment of the United States medium tank.

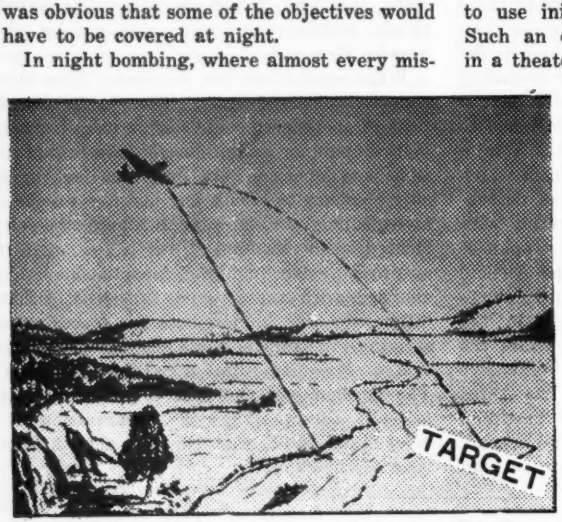
Another factor involved is the advantage given to the enemy by informing him which of his weapons is hurting the most. And along with this goes the similiar embarrassment of not wishing to disclose to the enemy the state of the measures you are most certainly taking to correct any demonstrated weakness in a particular weapon or in armament generally. *General of the Army George C. Marshall*

Night Bombing in China

CAPTAIN FOSTER DAVIDOFF, *Air Corps*

EARLY in the history of Fourteenth Air Force heavy bombardment it was determined that many of the high-priority targets would necessitate prohibitively thick fighter cover if attacked during the day. As most fighters were needed for other missions, it was obvious that some of the objectives would have to be covered at night.

In night bombing, where almost every mission presented its own variations and very often each plane comprised its own formation, it was necessary to think quickly, act without knowledge of precedence and—improvise. Given this leeway, unorthodox methods were frequently introduced and in many cases results proved gratifying to the extent that the method, devised to fit a particular situation, was accepted as standard procedure.



The Shoreline Method—Time and Distance Bombing.

The transfer of large aerial units to the Asiatic Theaters gives the study of operations in these areas added importance, both as a means of analyzing the effectiveness of our methods and as a way of determining the limitations imposed by terrain and visibility.

The problem of having to accomplish many varied commitments with the minimum of personnel and equipment has given staffs an opportunity to maintain unusually close contact with combat crews and has enabled them to put into almost immediate effect the lessons learned by crews on missions.

Moreover, it has given the individual unit (bombardier and crew) a splendid incentive to use initiative and sheer common sense. Such an opportunity rarely presents itself in a theater where the target is of first consideration and logistics second.

With these considerations in mind it will be interesting to note the methods used in night bombing and the type of terrain and target to which they were most readily adapted.

Most of the targets bordered on or were close to water masses (within twenty-five miles). This factor became the basis for ultimate night planning.

Although it was impossible to distinguish objects on the ground or in fact the ground itself, even at minimum altitude, it was an easy matter to see water by the reflected light on its surface, particularly along a shoreline where the contrast with the nonreflecting land mass was apparent. A simple time and distance system was evolved with excellent results.

The time of ground speed was computed from the time the aircraft was directly over the shoreline on a collision course to the target. Bombing statistics were predetermined from metro compiled prior to take-off. An answer was calculated to tell the individual bombardier how many seconds must elapse between passing the shoreline and releasing his bombs. Predetermined wind drift allowed the pilot to plan on the line of flight he must pursue to keep his plane the necessary distance upwind of the target for accurate bombing results, although at low altitudes, on a short run, wind drift became a negligible factor. By the light of exploding bombs it

was possible to judge the accuracy of hits and estimate possible damage.

A comparatively satisfactory method for target orientation at night was improvised by the author during an attack on the warehouse area at Bangkok, Thailand, in February 1944.

The initial point was the bend of a river, and this was found without difficulty. A high moon made water clearly visible, but it was entirely impossible to separate the target from the surrounding terrain. After flying in the general vicinity of the target for many minutes without success, eight batteries of enemy lights stabbed the darkness with blinding accuracy. They formed an almost perfect circle. The target chart showed them to be in a perimeter around the city, with the most northerly battery parallel to and about a quarter of a mile south of the target itself. With this picture in mind, a variable polaroid filter was placed in the sight to cut the glare and a run made on the searchlight itself. It was necessary to offset the latitudinal hair a mere fraction of an inch for correct bomb placement. Although the lights were extinguished before the run was completed, a sufficient period of time had elapsed to effect almost complete synchronization.

A similar attempt was made during a strike on the railroad yards and warehouses at Yochow, China. The yards were situated about half a mile east of the Tung Ting lake shoreline and ran parallel to it. It was relatively simple to judge the approximate location of the target although the dropping area itself, as in most other cases, was not visible. It was decided to circle the area until the enemy opened fire, thus giving away the position of his defenses. Eventually he did exactly as anticipated and bombs were dropped in the briefed area. Planes following the first one into the target dropped on the fires started by the first string. Bombing at intervals of from five to fifteen minutes, they were able to keep fires burning until the last plane had gone over.

The relative importance and contribution to night bombing makes it important that the use of flares be regarded adequately in any discussion of the subject. Properly employed they can be highly effective in counteracting to a great extent the difficulties imposed by poor visibility.

In the employment of flares the time factor must be given prime pre-operational consideration, as the effectiveness obtained is determined by the relationship of the plane concerned to the flare upon which it is dependent for light. This relationship includes the distance of the flare from the plane, the flare's height of operation above the terrain, and the height of the plane above the flare at the time of initial illumination.

Although the period of radiance for the individual flare lasts for five minutes, its most useful light is that thrown while it is at least five hundred feet above the ground. Consequently, it would be impossible for the using plane to drop a flare and make a turn in sufficient time to make use of the light thrown. It certainly would be highly inconceivable to plan a bomb run. However, if a follow-up ship were far enough to the rear, it would be possible to plan a run and anticipate the target in sufficient time to stand a fair chance of hitting the objective.

The use of one plane as a flare carrier might be considered satisfactory. This carrier would fly a continuous circle around the target area, dropping flares at regular intervals, frequently enough to keep the target illuminated until one ship had started fires by bombing. Follow-up planes would come in by elements or singly.

The obvious drawback to this type of employment is that one plane might be exposed to a considerable period of danger over the target area. It must be remembered, however, that where flares are employed as the only means of orientation aid, the target probably will be poorly defended, if defended at all, against night attack.

An excellent method, requiring extremely careful planning and timing for satisfactory results, has each plane carrying flares on the uppermost bomb stations. The flares are the last bombs to leave the ship and give light for the plane following. With a three to five minute interval between elements there is a

continuous light over the target area. The flares are dropped to begin illumination at approximately two thousand feet above the terrain. Planes fly above four and below eight thousand feet. The brilliant light, directed downward by a fiberglass shield, blinds ground observers, thus offering an added measure of security. It is absolutely necessary to have a well-experienced crew in the lead ship, as the entire mission depends upon this plane pinpointing the target area.

Using the above method in conjunction with the time and distance shoreline principles, as an added means of orientation, a mission was run on the warehouse district bordering the river at Canton, China. The shoreline was used for original orientation and the flares were employed to make synchronous bombing feasible. At 5,000 feet the buildings were visible soon enough to plan a bomb run. They looked much as they do from the ground in strong moonlight. All planes that followed the river as briefed were successful in picking up the target. The few that missed the initial point and dropped on what they *thought* was the target area, scattered flares where they were ineffective and misled some planes that followed.

Although the examples cited were chosen to illustrate specifically the points covered in this discussion, any other night mission, selected at random, would serve (perhaps less emphatically) to bring out the same factors. In the final analysis it can readily be seen that many methods, applied to fit a given situation, easily adapted themselves to bombing other targets of the same type. Moreover, by segregating targets into classifications dependent upon the terrain features in the vicinity of the drop area, an elastic combination of methods was initiated for the various categories.

The field of research and development is another in which Ground Forces are interested. The past has given to the art of warfare gunpowder, tanks, airplanes, rockets, and lately, recoilless weapons and the atomic bomb. The conflict just concluded has pointedly illustrated that, when properly organized, scientific advances hitherto undreamed of can be achieved in the space of a few short years. In many respects science has altered the aspects of war for the ground soldier, and advances of the future may alter them still further. We are, therefore, vitally interested in all new developments. We visualize guided missiles not only as long range strategic weapons, but also as short range devices with which the front line soldier can accurately destroy "pinpoint" targets. The Navy and Air Forces will also have a major interest in the development of such weapons. In the past, in submission of requirements to research development and procurement agencies there has been little or no coordination, with the result that Navy matériel could seldom be employed by the Army and vice versa. For example, in the past few years certain radar sets for the Army and Navy were developed independently for identical employment in the field. Army and Navy antiaircraft weapons, both large and small, are frequently or slightly different calibers. Analagous illustrations could be presented wherein radio, rocket and vehicular developments could be criticized. I see no reason why such inefficiency, born of the expediency of the past, should continue into the future. We do not desire to stifle competition in the development of matériel, but to coordinate our research where common usage and similar missions dictate the advisability of such a program.

General Jacob L. Devers

Divisional Baggage

LIEUTENANT COLONEL DICK A. KING, *General Staff Corps*
Assistant Chief of Staff, G-4, 3d Infantry Division

THE term "Divisional Baggage" is used by the Third Infantry Division to denote the individual clothing and personal effects of enlisted men which are not being worn or carried by the individual, i.e., those items that normally would be carried in the barracks bag.

The division sailed for North Africa in October 1942 with the conventional "A" and "B" barracks bags. The first failure of the conventional system became apparent during the landing, when four combat loaded transports were sunk before they had discharged their cargo, leaving the personnel from these ships without any barracks bags. These soldiers were left with only the clothing they carried on their backs, while other personnel from the same regiment had two full barracks bags with complete T/BA (Table of Basic Allowances) clothing.

The second primary failure of the "A" and "B" bag system became apparent when the Division moved from the Oran area to Tunisia the following spring. There being insufficient reinforcing transportation, the barracks bags were placed in storage, and the guard of the warehouse was taken over by another unit. Upon the completion of the Tunisian campaign, arrangements were made to have the barracks bags brought forward to the new assembly area at Bizerte approximately 1,000 miles from the Oran area. Loss and looting while in the original warehouses, while on craft headed for Bizerte, and in final transit to the division resulted in nearly sixty per cent loss.

Because of dissatisfaction with the barracks bag system in combat moves, and because it was impossible to entirely reequip prior to the invasion of Sicily, all clothing other than that to be worn by the individual plus one set of underwear and herringbone twill, was turned in prior to the mounting of the assault convoy. The only barrack bag items carried by the units were the personal items of the individual. A fifty per cent replacement on all clothing was loaded to arrive on D+5 and D+10 convoys. This system worked better than any previous system, but still meant that it was only a matter of time before the barrack bag would be used once more.

After arrival in Italy, the Division Quartermaster was charged with the operation of a Division Baggage Warehouse, where all regimental barrack bags were stored. The plan was to have the warehouse leap frog up behind the units, thus making the barrack bags easily accessible to regiments withdrawn from the line. The first problem that developed was transporting approximately seventy-five 2½-ton truck loads of regimental baggage and keeping it well forward. This resulted in the establishment of the Four-in-One barrack bags. Instead of requiring each individual to maintain a full T/BA of clothing, a Division Individual Clothing and Equipment list was published which prescribed what the individual would wear and carry (the seasonal uniform plus one pair of socks), what would be in the individual roll (normal equipment plus one set of underwear, towel, handkerchief, and two pair of socks), and what would be carried in the Four-in-One barrack bags.

The Four-in-One was one barrack bag containing four individual's barrack bags. Each individual barrack bag contained one set of shirt and trousers, one set of underwear (wool or cotton, depending on the season), handkerchief, two pair of socks, and the individual's "ditty bag," a small cloth bag containing the individual's personal effects that were purchased.

The theory behind this change was that the infantry soldier had absolutely no use for the large quantity of clothing previously carried in his barrack bag, since he never saw the bag except when in rest periods, and while in a rest period his only need was a change of uniform.

The only problem encountered with the

system was laundry; to insure that the clothing in the Four-in-One barrack bag was clean when the doughboy finally got it, and did not consist entirely of soiled clothing. This same problem had existed with the "A" and "B" bag system, while the infantry was in combat, and was never satisfactorily solved until the final Regimental Reserve System was placed in effect.

The Regimental Reserve System was partially a development of circumstances. Because there was insufficient space available on the craft assigned for the landing at Anzio, division once more established a division baggage warehouse for storage of the Four-in-One bags in the Naples area. Following the landing, the shortage of craft and priority of supplies precluded the shipment of the stored baggage at any early date. Similarly, the Anzio Beachhead having developed into a defensive position, there was no hope of an early overland shipment of the baggage as previously planned.

The situation was far from encouraging. Each infantryman had on the beachhead only the clothing he wore. New issues were limited, being insufficient to provide a second uniform to each man. And there were no laundry facilities on the beachhead, even the civilians having been evacuated.

The Seventh Infantry Regiment initiated the new system on a small scale by building a small laundry unit. The unit consisted of a gasoline water heater, a large washing machine (a metal tub with an agitator operated by a rocking arm attached to the lug bolt of a jacked up jeep rear wheel) and rinsing tub. The new clothing issued by the Quartermaster was not issued to individuals, but was put out by the Regimental Service Company to a regimental unit on an exchange basis. The soiled clothing received was immediately laundered and reissued on an exchange basis to another regimental unit. The two characteristics of the Regimental Reserve System were thus established. First, clothing lost its individuality, an infantryman no longer having any individually owned garment, but only one of each type of garment. Second, two sets of clothing per individual was not necessary, the second set being necessary only in sufficient quantity to change one battalion provided adequate laundry facilities were available.

This expedient was immediately instituted in the other two regiments. It became accepted as standard procedure because of the ease of operation, and incidently from several other factors. The Four-in-One bags stored in Naples were beginning to mildew, and there still being no available shipping, details were sent from the beachhead to strip the bags, turning in all issue items to the Base Section and forwarding the personal effects bags to the beachhead for regimental storage. Later, when Government laundry facilities became available on a limited scale, the use of both the homemade and the Government laundries permitted a rapid turnover of clean clothing within a regiment, and made changes of clothing feasible under nearly all conditions. The old barrack bag system had lacked this necessary elasticity for combat infantrymen.

In preparation for the landing in southern France, the Regimental Reserve System was officially established. In addition to publishing a modification of T/E 21, broken down as to clothing and individual equipment on the individual, in the individual roll, and in the Four-in-One barrack bag, another column was added for infantry only (the Four-in-One bag being for units other than infantry) prescribing the clothing to be held in Regimental Reserve. The Chart (see T/E on page 73) being on the basis of "per individual" it was directed that the Regimental Reserve figure be no less than twenty-five per cent nor more than 100 per cent of the allowance. In other words, for a strength of 3,000, a regiment was to carry not less than 750 shirts, wool, OD, nor more than 3,000. Even on the basis of a 100 per cent reserve, a saving in transportation requirements of approximately fifty per cent resulted. This is due to the fact that instead of 3,000 Four-in-One barrack bags per regiment containing one set of clothing plus the normal accumula-

tion of impedimenta, approximately 1,000 duffel bags, each bulk loaded with a particular item, were used.

However, while a saving in transportation is vitally important particularly in rapid moving situations to insure the availability of the clothing when and where it is required, that is not the most valuable contribution of the system. Important contributions are:

First, the system makes it possible to provide the infantry soldier with a clean uniform whenever his unit is not engaged with the enemy. If a company is out of the line for one day, instead of attempting to have 3,000 barrack bags forward so that the right 200 can be taken up, 200 uniforms are sent forward by battalion transportation and the change effected, the soiled clothing being returned to Regimental Service Company. This has even been accomplished while rifle companies were on the line.

Second, the infantry soldier has no concern over laundry of his clothing. A soldier normally has not time or opportunity to do his own laundry. Movement makes it impractical for him to arrange with civilians for his laundry. Government bundle laundry service is seldom available and requires more personal attention of the individual soldier than he is often able to provide. Under the Regimental Reserve System, the soldier, along with the rest of his unit, receives a clean uniform periodically, changes, and turns back his soiled uniform.

Third, the saving in clothing is one of the most astonishing aspects. Regardless of directives, punishment, and statements of charges, an infantry soldier in combat is indifferent to clothing responsibility, and no practical system has been devised to change his attitude. The keeping of the WD AGO Form 32 in combat is impossible and was discarded by this division during combat. If an infantryman had two shirts, he would normally throw away the dirtiest and wear the other. The Regimental Reserve System precludes this, since immediately after the clothing change has taken place, as many items are sent to the rear as came forward.

The operation of the laundry section of

TABLE OF EQUIPMENT

Individual Clothing and Equipment

Column 1—Item.
Column 2—On Individual (worn or in pack).
Column 3—Individual Roll.
Column 4—(4-in-1) Barrack Bag.
Column 5—Inf Unit Baggage.
Column 6—Salvage Prior to Embarkation.

1	2	3	4	5	6
Insignia, shoulder, sleeve	2		1[a]	1[b]	
Shirt, wool, OD	1		1[a]	1[bd]	
Trousers, wool, OD	1		1[a]	1[bd]	
Trousers, H.B.T.	1[e]		1[e]	1	
Belt, web, Waist, M1937	1				
Drawers, cotton, shorts	1	1	1[a]	1[b]	
Gloves, Horsehide, Riding Unlined	1				
Handkerchiefs, cotton	2	1[a]	1[a]	2[b]	
Helmet, steel, comp., M1	1				
Insignia, Chevron	2		1[a]	1[b]	
Jacket, field, or combat	1				
Jacket, H.B.T.	1[e]		1[e]	1	
Laces, shoe, pair	1	1			
Leggins, can., d/mtd pair					1
Raincoat, d/mtd	1[a]	1[b]			
Shoes, combat, pair	1			1[e]	
Sock, wool, light, pair	2	2	2[a]	2[b]	
Strap, shoulder, MP	1[f]				
Undershirt, cotton	1	1	1[a]	1[b]	
Undershirt, wool		1			
Brassard, MP (only)	1				
Brassard, American Flag	1				
Laces, Leggin, pair					2
Caps/hats, H.B.T.					1
Bag, barracks			1[a]		
Bar, Insect, field		1			
Blanket, wool, OD		2			
Can, meat	1[a]			1[b]	
Canteen	1				
Cup, Canteen	1				
Fork	1[a]			1[b]	
Headnet, mosquito	1				
Knife	1[a]			1[b]	
Necklace, Ident., tag	1				
Pin, tent, shelter		5			
Pole, tent, shelter		1			
Pouch, First Aid Packet	1				
Roll, bedding, waterproof		1[g]			
Spoon	1				
Tag, Identification	2				
Tent, shelterhalf		1			
Toilet Articles (set)	1				
Towel, Bath		1			
Towel, Huck	1		1[a]	1[b]	
Belt, Cartridge (or Pistol)	1				
Cover, canteen	1				
Pouch, Pistol, Clip or Carbine, Clip or mag., 5 pocket, TSMG	1[h]				
Cover, protective	1	1			
Tool, entrenching	1				
Cover, weapon, protective	1				
Gloves, mosquito				1[b]	
Bag, sleeping			1[a]	1[b]	
Haversack (complete) (or field bag)	1				
Personnal, effects				1	
Bag, Personal, Effects				1	

[a] Except Infantry.
[b] Infantry only.
[c] Cooks & mechanics only.
[d] ¼ per individual in infantry only.
[e] Retain odd size service shoes w/one pair leggins.
[f] Until exhausted.
[g] Per Officer & WO.
[h] As per T/E.
[i] One pair per individual.

the Regimental Service Company is relatively simple. As clean clothes return from the laundry in bulk, they are sized by company personnel. Initially sizing was broken down into only large, small, and medium, but it was found that the increased effort necessary to size shirts and trousers by even sizes in the normal two dimensions was more desirable. The clothing is then placed by size in duffel bags, normally twenty items per bag. Approximately once a week each company supply sergeant prepares a tally-out listing the sizes required for his entire company. The requirements are filled by Service Company personnel from the duffel bags and issued to the company supply sergeant, who later returns the soiled clothing and receives a tally-in. Any discrepancy between the tally-out and tally-in is obvious and the necessary action taken. The soiled clothing collected by the regiment is taken to the government laundry, when available, on the schedule of the Division Quartermaster.

The "ditty bags," which contain the personal effects of the individuals, are tagged with the owner's name and stored in the Service Company by organization. Whenever a unit goes into a rest area the "ditty bags" are delivered to them. Also, in the cases of casualties, the personal effects are already sorted and available for disposition.

There is one aspect of the Regimental Reserve System which can and must be improved. That is the bulk laundering of the clothing. Laundry units never arrive until long after D-day. During rapid movement they are far to the rear, and sometimes move to a new sector, temporarily losing all laundry being processed. At other times all laundry units are completely committed to hospitals.

The practical solution is to have small mobile laundry units issued on the basis of one unit per regiment, one per division artillery, and one per special troops in an infantry division. A complete unit of water heater, tumbler, extractor, and drier could be mounted on two one-ton trailers. The issue of one per regiment is by far the most critical need, and will solve one of the most difficult administrative problems now faced by a division.

In each succeeding war there is a tendency to proclaim as something new the principles under which it is conducted. Not only those who have never studied or experienced the realities of war, but also professional soldiers frequently fall into the error. But the principles of warfare as I learned them at West Point remain unchanged. They were verified by my experience in our Indian Wars, and also during the campaign against the Spaniards in Cuba. I applied them in the Philippines and observed their application in Manchuria during the Russo-Japanese War.

It is true that tactics of the battlefield change with improvement in weapons. Machine guns, quick-firing small-bore guns and rapid-fire artillery make the use of cover more necessary. They must be considered as aids to the infantryman, expert in the use of the rifle and familiar with the employment of hasty entrenchments. It is he who constitutes our main reliance in battle.

General of the Armies John J. Pershing

Task Force Planning

LIEUTENANT COLONEL WILLIAM H. BILLINGS, *Infantry*
Former Instructor, Command and General Staff School

AMPHIBIOUS action has prefaced all of the principal land offensives launched by the United Nations in this war except the British-American-Chinese effort in Burma and operations of the Red Army against Germany and Japan. In the conflict with Japan in the Pacific, this held true up to the occupation of the Jap homeland.

Since 1942, the United States has progressed steadily toward the ultimate goal of perfection in the planning and execution of joint task force operations. Many bitter lessons have been learned and increased experience has taught us to approach the solution of each new amphibious problem with an open mind. Principles remain unchanged but the technique to be applied may vary with each operation.

Let us assume that we, as staff officers of a task force headquarters, have received instructions to prepare a joint study or estimate based on a directive given our commander by the Joint Chiefs of Staff to mount an assault against the island of "X" in the Pacific. The target date will be five months from today.

There are three individuals in the task force who are vitally interested in the results of our joint study from the viewpoint of planning. These are the senior commanders of the ground, naval, and air forces to be employed in the operation. As a result of experience gained in planning the Marshalls operation, the senior ground commander, in this case the commanding general, V Amphibious Corps, recommended that the joint staff study from higher headquarters, designating objectives, organizations to be employed, target date, and all other data necessary to plan the operation, should be issued not later than D minus 100 days. Assuming that this recommendation has been adopted as policy, we have approximately fifty days to prepare the study.

Information upon which this study will be based is available from many sources, some of which are as follows:

a. The directive.

b. War Department studies.

c. Office of Naval Intelligence (studies and reports).

d. Joint Intelligence Center, Pacific Ocean Areas (JICPOA).

e. Office of Strategic Services (studies and special requests).

f. Theater Studies (already prepared).

g. Aerial photographs.

h. Maps.

i. Submarine periscope photographs of beaches and submarine reconnaissance of offshore conditions.

j. Monitoring of Jap radio nets.

k. Coast watches (radio reports, etc.).

l. Results of prisoner-of-war interrogation.

m. Study of captured enemy documents.

n. Actual land reconnaissance by persons or parties landed from submarines.

It may be necessary to accept certain assumptions as a basis for portions of the study until definite information has been received.

There must be a starting point in the development of a joint study. A thorough analysis of the target area will produce the framework upon which to build a workable plan. It must be approached from the viewpoint of all three of the operating services—ground, navy, and air.

The ultimate mission of any joint operation is the destruction of the enemy force. The selection of the land objectives in the target area must facilitate the accomplishment of this mission. Landing areas should be so located as to place the assault troops ashore in a favorable position to secure these objectives and should possess natural terrain features on which one or both flanks may rest. Other considerations affecting the choice of landing areas are the presence of a sufficient number of favorable beaches; maneuver space to permit both approach and landings on a broad front commensurate with the size of the landing force; presence of a suitable road net running inland to insure

the movement of troops, artillery, heavy equipment and supplies toward the objectives; absence of natural obstacles which could prevent or hinder the advance; location of enemy reserves; presence of sheltered offshore areas for transports so that weather will have the least effect on debarkation; sheltered landing points where temporary floats and jetties can be employed for unloading in the early phases; suitable waters for anchorage and protection of the convoys as soon as the coast has been freed from enemy artillery fire; and ultimately, a harbor suitable for the maintenance of the military forces ashore and of the naval forces afloat.

These considerations greatly affected the choice of the landing areas for the Normandy operation. The Caen area on the eastern coast of the Normandy Peninsula was selected instead of the Pas de Calais location as the landing area for the 21st Army Group because it offered more shelter for shipping, fewer coastal batteries and beach defenses, weaker concentration of German reserves, natural obstacles on both flanks, and the proximity of the port of Cherbourg. By destruction of all crossings over the Seine River on the north and the Loire River on the south by air action prior to D-day, serious obstacles to the movement of German units into the peninsula were created. All of these considerations helped to insure the success of the landings and the subsequent operations.

In turn, the selection of beaches within the landing area should fit in with the tactical plan for the placement of assault troops in relation to the objectives to be taken. The number and location of beaches selected for the landings are decided by the senior ground commander after a careful estimate by both ground and navy in which the viewpoints of both services are given due consideration. Successful landings have been made on shore lines that at first appeared to be inaccessible. The writer participated in such a landing, as assault battalion commander, on Green Beach just west of Licata, Sicily, during the invasion of that island on 10 July 1943. The beach was about one hundred yards wide and located in a narrow opening between two hill masses. Off-shore conditions were bad due to the presence of innumerable jagged rocks. The beach area was heavily wired and included many defensive works. Molla Rock, about eighty-seven meters high, commanded the off-shore approach to the beach. In addition to the beach defenses, the enemy had one anti-boat gun and five machine guns emplaced on the rock. However, the landing was effected about two hours before the start of morning nautical twilight with no moon, and complete surprise was obtained. It was superb navigation on the part of the Navy that enabled the force to land on such a small spot on a hostile coast under conditions of absolute darkness and on the tailend of a severe gale which quieted just before H-hour.

This brings up the problem of the decision as to the hour of landing, which is considered jointly by the ground and navy commanders in charge of operations. When airborne troops are to be used in conjunction with the waterborne invasion, the air commander and the airborne division commander should also be consulted. Landing under cover of darkness greatly increases the chance of securing some measure of tactical surprise and lessens the efficiency of defensive fires. Landing during daylight permits more favorable navigational conditions with better naval gunfire and air support. These factors, together with conditions of weather, tides, and off-shore currents must be carefully weighed in determining H-hour.

The list of available shipping and the organizations to be employed will be included in the joint staff study. The decision regarding neutralization missions prior to D-day and the principal mission of the task force will be definitely stated.

It is possible that a tenative operation plan may be issued to the subordinate commands prior to the completion of the joint staff study in order that planning by the lower echelons may get under way.

On consideration of the joint staff study and such tenative plans that may have been issued by task force, the senior ground commander recommends any changes in the troop

basis and equipment which he believes necessary for the successful accomplishment of the assigned mission.

The senior naval commander, after approval of the troop basis by higher authority and after consideration of his mission as assigned by the Force Plan, recommends any changes in the assignment of shipping to lift the force and in the number of support vessels necessary to carry out the naval part of the expedition.

When completed, the plans of the ground, air, and navy commanders are reviewed by task force headquarters. The ground plan includes the embarkation and landing phases. The navy plan includes the movement overseas phase, convoy protection, neutralization missions, feints, and support of the landing. The air plan includes pre D-day missions, support of the landings and subsequent operations, and the establishment of air bases in the captured areas.

There are certain important matters which must not be overlooked at this time. By D minus 90 days, complete photographic coverage of the target should be directed. It has been recommended by the 5th Amphibious Force, Pacific Fleet, that this photo coverage include verticals of a minimum scale of 1:10,000; and obliques at the shore line showing beaches of minimum scale 1:5,000. These photos should be delivered immediately for distribution to subordinate units. It is vitally necessary that the ground units to be employed in the operation be assigned to the ground commander not later than D minus 75 days. This will facilitate training of the unit for the specific operation. Decisions must be made as to the maps to be used, together with standardized grid system for all participating services. Distribution of these maps within the force must be determined.

The intelligence section must prepare its plan to insure a steady flow of information concerning enemy dispositions and terrain until D minus 1 day.

It is possible for the ground, air, and navy commanders to prepare and issue their plans based on the Task Force Joint Staff Study or even on directives or tentative plans. In operations in the Central Pacific, it has been found imperative that the Task Force Plan be issued to subordinate commanders not later than D minus 45 days.

The Force Operation Plan takes the form of a five-paragraph field order briefly covering important points, with all details contained in the many annexes, some of which may be as follows:

Able:	Task Organization
Baker:	Air Support Plan
Charlie:	Naval Gunfire Support Plan
Dog:	Designation of Beaches
Easy:	Force Landing Schedule
Fox:	Intelligence
George:	Shore Party Plan
How:	Signal Communication Plan
Item:	Task Force Command Relations
Jig:	Medical Plan
King:	Engineer Plan

Now let us consider details included in some of these annexes.

a. Task Organization.—In this we will show the composition of our naval attack forces, including the ground landing force; and the reserve force.

b. Air Support Plan.—Here again we show the composition by task group of the naval carrier-based air to support the operation and the organization of the land-based aircraft. We refer to the preliminary air operations against enemy bases by land and carrier-based aircraft and designate the commander. The plan is then subdivided into the objectives for each attack force and under each is listed the scheduled air support for D-day and such subsequent operational days as are believed necessary—usually not beyond D plus 1 day. An "X" paragraph will include such items as assignment of aircraft for spotting naval gunfire and artillery; availability of ambulance planes; assignment of a plane in each carrier group for the "air coordinator," planes for the "air liaison observer" who informs the landing force commanders (through commander support aircraft) of the ground situation; the directive to carrier group commanders to be prepared to make vertical and oblique photo reconnaissance as ordered by attack force commanders; the request that attack forces and task groups

provide local combat and antisubmarine patrol; a summary of the air-ground pyrotechnic code; panel code; grid system, as applied to target designation; pilot combat reports on start and completion of mission; initial points; and provisions of the release of CAP [Combat Air Patrol] aircraft to direct support missions. Reference is made to standard doctrine and the appendices include target charts and maps of the objectives.

c. Naval Gunfire Support Plan.—Since fire support groups are an integral part of each attack force initially, no reference is made to task organization in this annex. Flexibility is retained so that FSG's [Fire Support Groups] can be concentrated on one or more objectives if an emergency arises. First we list the pre D-day missions showing numbers and types of vessels and ammunition restrictions. Instructions to ships and plane spotters are stated. The phases of naval gunfire in support of the landing and capture of assigned objectives are listed somewhat as follows:

(*1*) Initial counterbattery fire to protect the transports.

(*2*) Area bombardment to destroy secondary defense.

(*3*) Destruction of beach defenses.

(*4*) Close supporting fires on beaches to support the landings, giving times and targets for shifting fires when boats are about 300 yards from shore.

(*5*) Call fires by SFCP [Shore Fire Control Parties] and continued slow neutralization fires on target areas 400 to 800 yards from the nearest troops. Reference is made to bombardment principles. Under an "X" paragraph the following may be considered:

(a) Coordination of gunfire support plan with the air and artillery plan to prevent mutual interference, danger to planes, and duplication of effort;

(b) Destruction of certain types of targets located along or near the beaches;

(c) The total ammunition allowance allocated for shore bombardment according to caliber per gun; and

(d) Restrictions, if any, on D-day bombardments.

d. Designation of Beaches.—Marked maps showing beaches for each attack force.

e. Force Landing Schedule.—Times and method of landing and landing areas for each attack force.

f. Intelligence.—Lists all maps, charts, and photographs with a summary of enemy situation; EEI [Essential Elements of Information]; disposition of prisoners of war and captured documents; counterintelligence; issue of maps and photographs; public relations; and reports. Appendices may include reconnaissance and observation missions assigned to air, surface, and subsurface craft from D minus 30 to include D-day.

g. Shore Party Plan.—This annex lists the general assignment and organization of shore parties.

h. Signal Communication Plan.—Lists command nets and liaison nets. Gives designation of command posts afloat for task force, expeditionary troops, landing forces, and reserve forces. SOI [Signal Operation Instructions] issued separately.

i. Task Force Command Relations.—Shows command diagram between task force, senior ground, navy, and air commands. Shows diagram of command relations between the landing and attack forces and those within the landing forces.

j. Medical Plan.—Gives in general the supply, evacuation, and hospitalization plan.

k. Engineer Plan.—This differentiates between the mission of the combat engineers and the shore party engineers and also covers engineer supply.

A Force Administrative Order with annexes will accompany the Operations Plan.

The work of the task force staff does not diminish after the issuance of the Force Plan. Alternate and cover plans are prepared. Studies of current operations are made and the lessons learned from these may result in mandatory changes in the approved plans. Additional intelligence received from agencies relative to the target area may also necessitate revision of the plans. The staff must maintain close liaison with higher and subordinate staffs and insure the execution of the commander's will.

MILITARY NOTES AROUND THE WORLD

U.S.S.R.

Russians Trained on Aleutian Isle:

Between March and September of 1945 the United States Navy trained 15,000 Russian Navy officers and men in the handling of American landing craft at Cold Bay, a tiny island of the Aleutian chain, and turned over to them under lend-lease 138 landing craft, mine sweepers, and other craft smaller than destroyers.

It is not known what use the Russians intended to make of the vessels. Some sources, however, indicated the Russians planned to use the craft in an invasion of the Kuriles or perhaps Korea.

Cold Bay, a barren out-of-the-way island, was chosen for the training because it was off the regular shipping routes developed by the war.

In the training motion pictures were used as well as lectures and actual instruction. At first the Navy would use half American and half Russian crews, then cut down until the Russians were doing everything while a few Americans stood by to see that everything worked smoothly.

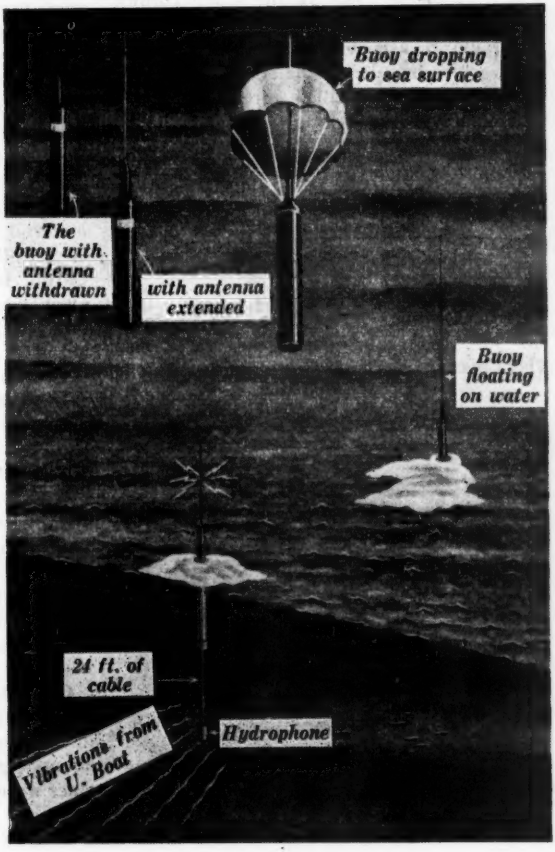
At one time 6,500 Russians were on the island, with thirty American officers and between 300 and 400 Americans to instruct them.

(From a news report)

UNITED NATIONS

E pendable Radio-Sonde Buoy:

One of the many ingenious inventions by Allied scientists to combat the U-boat "wolf-packs" which infested Atlantic waters during



the war was the "E pendable Radio-Sonde Buoy," a radio device which was dropped from the air. By this means it was possible to trace the U-boats and relay the information to hunting air or surface craft. In the drawing, the top left diagram shows the sound buoy with its radio antenna withdrawn; the next shows it extended. In the third diagram, the buoy is shown dropping to the water by parachute, through which the antenna protrudes. The fourth diagram shows the buoy floating upon the water. In the lower left is shown the manner in which the bottom compartment, containing a hydrophone, separated from the rest of the unit to sink twenty-four feet below the surface. The hydrophone picks up the sound thrown off by the U-boat, and relays it by cable to the radio transmitter in the top compartment, which broadcasts the signal to waiting ships and planes. Allied aircraft dropped several of these buoys in diamond-shaped patterns wherever a pack of U-boats were suspected.

(*The Sphere*, Great Britain)

GREAT BRITAIN

The New Centaur Tank:

Great Britain's latest tank, the Centaur, has just been taken from the secret list. The Centaur is a cruiser tank mounting a

six-pounder gun. It is described as having a three-man turret. No other details are yet released. (From a news report)

Decoy Targets:

Over 500 decoy targets were used in Great Britain during the War to "fox" German pilots. Official sources estimate that these dummy targets saved 2,500 lives and over 3,000 injuries. At least five per cent of the bombs dropped on the British Isles were drawn from their intended targets.

Dummy targets included airdromes, docks, railway sidings, and buildings. Dummy fires were used extensively, especially in the Midlands. Imitation airdromes were laid out all over the country, boundary lights were switched on when enemy aircraft were approaching, and, on Salisbury Plane, dummy airplanes, with navigation lights showing, were towed down a dummy runway. The airdromes were so realistic that even in daytime cases occurred of lost pilots landing on them.

To the end of June 1941, decoy airdromes had drawn 322 attacks, compared with 304 delivered against RAF airdromes. Decoy lighting to deceive mass raids was not found satisfactory, and experiments were tried out with three different types of inflammable material to simulate large fires. These were electrically fired, and called "Starfish." At Cardiff in one night 150 bombs were drawn away by a single Starfish fire. At Middlesbrough also decoy fires operated by the civilian staff of Imperial Chemical Industries attracted a high proportion of bombs aimed at the city.

(*The Aeroplane*, Great Britain)

Royal Navy Strength:

Britain has fifteen battleships and thirteen aircraft carriers.

This was the first information of Britain's strength in fighting ships to be given out since 1939. The other main components of the Royal Navy are forty escort carriers (two in reserve); 225 destroyers (eighteen in reserve); seven cutters and 128 submarines.

Of the battleships, five are in unmaintained reserve. Two of the aircraft carriers are in reserve. One battleship, three cruisers, twenty-eight destroyers and fifteen submarines were listed as "on loan to other navies."

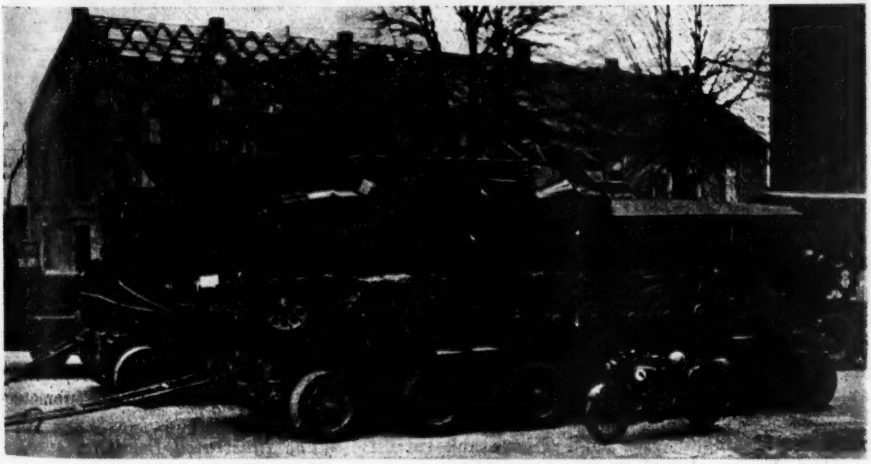
(From a news report)

GERMANY

German Experimental Tanks:

The photographs show examples of Germany's latest developments of the heavy tank. Four types, for the most part never tested in battle were brought to England for examination and experiment. The biggest of them all, the E.100, even without turret and gun weighed eighty-seven tons, and on its recent journey, with its transporter, weighed over 100 tons. The Grille is a mobile defense

The heaviest of the German tanks: the E.100.



An experimental German tank, never used in war, the Grille.

A monster tank destroyer: the Jugd Tiger, with a 125-mm gun. It weighs sixty-nine tons.

A submarine tank: the Underwater Tiger, which maintains radio contact while submerged.

gun of sixty-seven tons. The gun of this tank preceded it to England for study; but the whole weapon had never gone beyond the experimental stages. The Jugd Tiger tank is a heavily armed tank-destroyer; and the Underwater Tiger, designed to cross rivers up to sixteen feet deep, can remain submerged for at least five hours.

(*The Illustrated London News*, Great Britain)

UNITED STATES

New Giant Mortar:

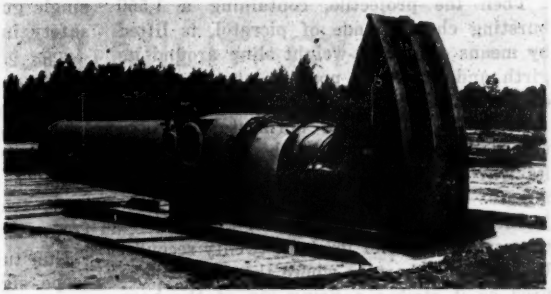
The War Department has revealed details of the giant 914-mm (36¼-inch) mobile mortar, largest and most destructive weapon of its kind, capable of hurling a 3,650-pound projectile a distance of six miles.

Dubbed "Little David," the giant mortar has a rifled 22-foot, muzzle-loading tube which weighs approximately 80,000 pounds. The mortar's base assembly, on which the tube rests, is constructed like a huge box and weighs 93,000 pounds.

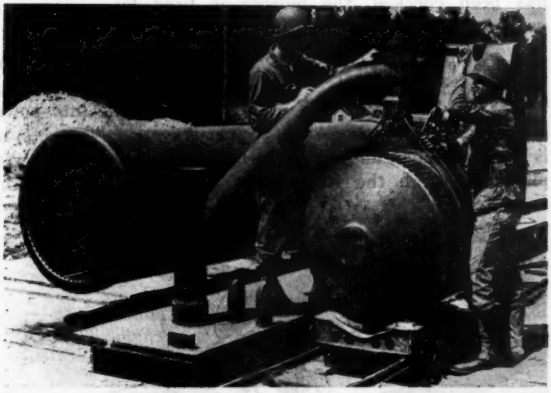
While traveling, the mortar's tube and base assemblies each make up separate tractor loads. A complete "Little David" unit also includes a bulldozer and crane. The huge mortar can be emplaced in twelve hours, while the largest (820-mm) known German artillery weapons were hauled on twenty-five railway cars and required three weeks to put in firing position.

Various methods for emplacing the giant mortar were tried and the ramp system was found most satisfactory. This requires a deep pit with a ramp leading to the surface. The base assembly is driven into the pit and earth packed around the base until it is flush with the surface.

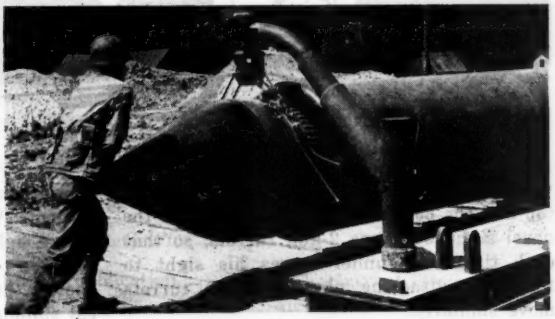
The mortar's 3,650-pound projectile is brought to the emplacement by truck. In loading, the doughnut-shaped propelling charges, consisting of a 136-pound powder base and two equal increments weighing forty-one pounds each, is placed in the tube.



The assembly resting at 0° elevation. (U.S. Signal Corps Photo.)



Rear view of projectile being lifted from dolly into tube assembly at left. (U.S. Signal Corps Photo.)



Projectile lifted into position and rocked into tube assembly. (U.S. Signal Corps Photo.)

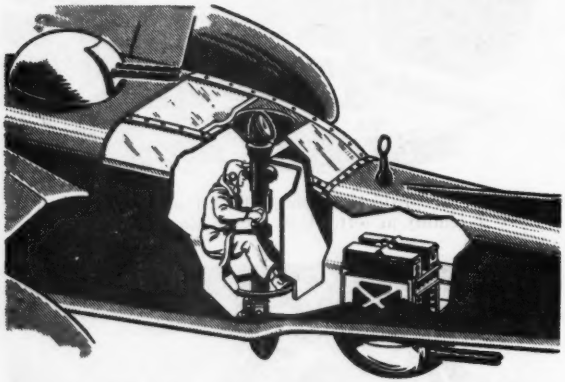
Then the projectile, containing a 1,550 bursting charge made of picratol, is lifted by means of a light-weight sling around its girth and placed in position at the muzzle of the tube.

With the tube in a horizontal position, two or three men start the projectile on its way about six to eight inches into the muzzle. After the tube is raised, the projectile slides down to a seat at the front of the powder chamber in about twenty seconds. Unlike small mortars where the projectile is fired as it strikes a firing pin at the base of the tube, the "Little David" projectile rests in the chamber. Then, after the range has been checked, the mortar is fired by use of a conventional lanyard.

(From a news release)

Periscope Gun Sight:

Major part of the A-26 gunnery system is the periscope gun sight, which passes completely through the fuselage of the plane, with sight heads emerging from both the top and the bottom. Remote control links the novel sight with two 2-gun turrets, so that each time the gunner moves his sight to follow an attacking plane the gun turrets move similarly.



Position of gunner using the periscope sight.

Both the upper and lower A-26 turrets and the periscope sight are controlled by a single gunner who is located in comparative safety in a remote sighting station.

The 2-headed arrangement of the periscope sight allows a gunner to scan the skies for an enemy above his own plane, to either side of it, or beneath it. When an attacker climbs or dives from one hemisphere to another, a flip-over mirror within the instrument transfers the gunner's line of sight from one end of the periscope to the other.

Gun turrets follow movements of the periscope sight so rapidly that the two move almost simultaneously. This precision of motion between the sight and the guns is made possible by ingenious electrical devices called selsyns, which transmit an electrical message to other selsyns in the turret above which way the guns must move. After being amplified, this electrical message is converted into power that runs motors and directs the turrets, bringing the guns quickly into alignment with the sight. In battle action the A-26 gunner is seated so that he can revolve around the periscope tube, his eye to the sighting eyepiece, and follow the maneuvers of an attacking ship in any quarter of the sky.

The optical system for the periscope sight is similar to those used in submarines.

(*Army Ordnance*)

New Army Hospital Trains:

The task of bringing casualties home is being performed with utmost comfort and speed in new luxury cars for hospital trains.

The hospital cars have special accessories for maximum comfort and the treatment and feeding of patients. With three-tier bunks to accomodate thirty-eight, the car is fitted with an elaborate dinette, two lavatories, dressing room and shower, utility rooms, wall closets for medical supplies, and separate compartments for medical personnel.

(*Army Times*)

FOREIGN MILITARY DIGESTS

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Military Activities of the French Resistance Movement

Translated and digested at the Command and General Staff School from an article in French by Lieutenant Colonel Combaux in "Revue de Défense Nationale" (France) December 1945.

PRIOR to the liberation of North Africa, the link between "la France résistante" and her Empire was located in England. It was the organization created by "La France Combattante." Later, at Algiers, the work of this organization was taken over by the Committee of National Defense which dealt, on a higher plane, with all the military, air, and naval questions throughout the Empire. However, it did not deal directly with the "Resistance," this was done by the Committee for Activities in France through the Central Intelligence and Operations Bureau of London (BCRA).

After the liberation of North Africa, an affiliated organization of the BCRA was created in Algiers. Then, a short time before the landing, this organization was augmented by two supplementary commands—the Delegation of the Northern Zone and the Delegation of the Southern Zone of the French Committee of National Liberation which were, each in its own zone, to coordinate the activities of the French Forces of the Interior with those of the French and Allied expeditionary forces.

Of the two Bureaus, that of London was always to play the principal role, for obvious geographical, military, and technical reasons. The organization of the intelligence networks and of the activities in counter-espionage, aerial transportation, parachute landings, instruction of our agents were all concentrated there. The most important leaders of the Resistance met there during the course of their brief missions to England.

We have no intention of maintaining that the forces of the Resistance acted in all respects in accordance with the orders of the London Command. This was an impossibility. In the main, the activities of the Resistance possessed the impulsive character typical of all popular activities. Numerically, the Resistance forces were strong. They were jealous of their independence. Their leaders knew the local situation, its particular aspects, and possibilities. On the other hand, they did not have a view of the operations as a whole. For obvious security reasons, any excessive centralization was prohibited. Therefore, it could not be expected that the committees of the Resistance located on the home soil would be able to exercise any far-reaching or constant military control over our Forces of the Interior.

A very different character was possessed by the French organizations in London and Algiers. The French organizations in London and Algiers had at their disposal the powerful technical means of communication necessary for maintaining contact with all parts of the territory. Also, they alone possessed the necessary view of the situation as a whole. But, on the other hand, they were ignorant of details. They could assign general missions only, unify tendencies, and coordinate efforts. They had to feel their way in the midst of contradictory information. Evaluation of local factors and tactical recommendation varied according to the mentality and political doctrines of the various groups.

In spite of these difficulties, however, the activities of the London French Command were continually increased, as was, also, the unity of the Resistance. To be sure, many persons who were witnesses of the rapidly moving episodes of the struggle undertaken against the invaders or against Vichy may have gained the impression of a somewhat hit-and-miss, confused, and chaotic disturbance which did not appear to them to serve any definite military purpose. But that was only apparent. The historian of the future will be able, with sufficient clarity, to distinguish four principal phases: the organization of the intelligence network, the sabotage activities, the training of the Army of the Interior, and the battle of liberation.

In the beginning, the first emissaries merely attempted to create, in the midst of the German armies, an immense intelligence

network. The main difficulty was to organize the clandestine radio contacts and develop sufficient operational regularity and efficiency in the transmission of the considerable mass of information collected. The broadcasting stations of the British Broadcasting Company and the receiving stations of the special British services augmented their facilities, while the clandestine radio sets and codes were delivered in innocent looking valises to the Resistance forces. The intelligence networks had hardly attained sufficient development when new needs arose, calling for still greater expansion. The Wehrmacht, which no longer dared to invade England, began the total exploitation of the conquered countries. From this time on, the French Resistance was obliged to orientate itself resolutely in the direction of economic sabotage. The intelligence networks remained, but alongside of them were organized operational networks.

We are all aware of the fact that there were a good many persons who looked with disapproval on the immediate action carried out by the hotheaded elements of the Resistance, even during the very first days of the occupation. A good many of the French, through fear of reprisals, desired to see the activities of the Patriots limited to a silent and secret preparation for D-day. This attitude, objectively, turned its back on hard military realities. One could not, quite certainly, hurl himself openly upon the enemy. Fighting had to be carried on in the dark, had to assume the most subtle of forms. Immediate action was required for two fundamental reasons. The first was an eminently moral one. It was the only way of saving our people from shame, of training the Partisans gradually, of initiating them in the tactics of sabotage and guerrilla warfare, of preparing them, in short, for the mass action which was to be engaged in by them in the battles of liberation. The second reason, a purely material one, derived from the necessity of wearing down, to the maximum extent, the German economic strength and for saving our Allies from the necessity of subjecting our own country to the terrible bombing unleashed against Germany.

By the end of 1943, owing to the possibilities of an Allied landing, the French Resistance was faced with the necessity of forming the partisans into a veritable Army of the Interior, their operations were to be coordinated with the efforts of the Allied landing forces. Such a situation gave rise to very complex problems. For the purpose of solving them, a staff was created in the BCRA. Its mission was to prepare the operations of the Resistance in the second battle of France.

Study of the Landing

It would have seemed reasonable that for accomplishing such a task the French Command should have been kept informed with regard to the Allied plans. We were very soon to learn that the Anglo-American Command would not be able to reveal anything regarding its plans. There would have been too much risk in confiding these secrets to too many men. Under these circumstances, there was but one thing that could be done: to study the landing independently of our Allies. This study, carried out by five officers, was handed over to the Allied Staff on 21 January 1944.

The hypothesis was that a military landing, independently of its tactical factors, would be essentially a question of transportation. Hence, the Allied landing could not be made in France except in those regions where the tactical, geographical, and technical conditions would permit a preponderance which the Germans could not oppose. A study of the accessible beaches, and the territory onto which they opened suggested four hypothesis: (1) Somme-Scheldt, (2) Normandy. Brittany, (3) Gascogne, (4) the Mediterranean.

The employment of the FFI (French Forces of the Interior) was to be dominated by this absolute necessity and its activities would vary *in time* in accordance with the necessities of the battle, and *in space*, in accordance with the nature of the particular region involved. The activities of the FFI were to begin with the mass sabotage of the enemy strategic concentration. The "Green Plan"

dealt with the sabotage of the railroads, long-distance telephone cables, and interferences with highway transportation. After this initial action and for a few months thereafter, it was the duty of our Command to regulate the activities of the FFI in accordance with the development of the battle. For its activities were to vary, depending on the location of the operations and on the geographical features from the point of view of the operations, we knew already that our great, northern plains (Brittany, Normandy, the Paris basin, Flanders) would be overrun by the Allied advance moving in the direction of the final strategic objective. The same would be true in the case of the Mediterranean coast, the valley of the Rhône or the foothills of the Alps, on the assumption of a landing in the south.

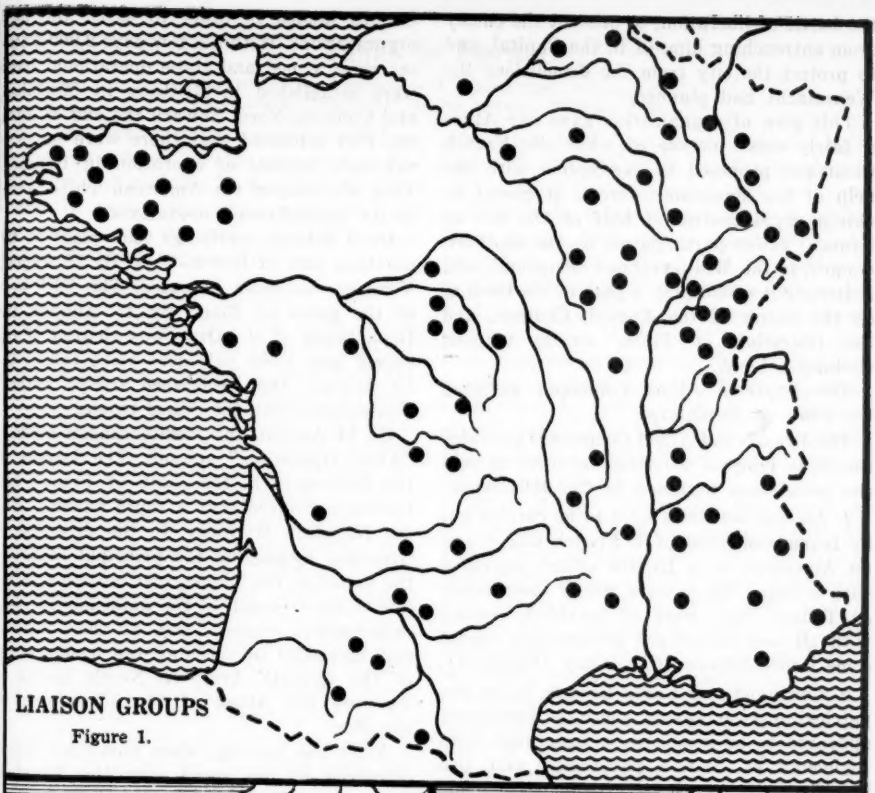
In the battle and rear zones, which would be strongly guarded, the FFI poorly armed as it was, could not dream of making an open attack on the organized forces of the German army. At the most, the movement of civilians, fleeing toward the rear zone and the opposite movement of troops going into battle would create an atmosphere favorable to clandestine activities. The task of the FFI here was to guide Allied paratroops, to provide them with information, and to engage in sabotage individually or in small groups. In addition, in the large cities, they were to seize every occasion for lightening the task of the liberation by the Allied troops and were to cooperate with the airborne forces.

The battle and rear zones were, naturally, not very favorable to the activities of the maquis. At the very most, certain sections (the heaths of Brittany, Norman Switzerland) could, as a result of their geographical configuration, serve as hideouts for a few partisan groups. On the other hand, it was also conceivable that there would also be zones not affected by the operations. These would be off the supply lines of the Wehrmacht, either because of the difficult nature of their terrain or because of their being too far from the theater of operations. There would be very few Germans in these zones and being natural places of refuge, they would provide the largest contingents for the FFI. These regions which, for the most part, would be mountainous and wooded (the Pyrenees, the Alps, the Central Massif, the Jura, the Ardennes, the Vosges, Forez, Morvan) were to be organized as bastions of the Resistance. It was there that the maquis were developed.

The role of the maquis was both an offensive and a defensive one. It was offensive in that they served as assembly areas for guerrillla raids carried out in the rear of the enemy, and defensive in that they served as places of refuge for the Partisans. It was there that we were obliged to locate our principal command posts, our message centers, our armament, food, medical supply depots, and the fields where our planes could land and bring in supplies.

From the point of view of the Army of the Interior, the Staff of the Resistance distinguished three types of zones: (1) The maquis zones, (2) the zones under the influence of the maquis, where guerrilla raids were conducted and (3) the zones which were outside the sphere of action of the maquis and in which technical and geographical circumstances limited the resistance to secret warfare and sabotage.

The organization proposed to the Allied Command included five groups: the Pyrenees group; the Central Massif group, whose zone of influence extended, westward to a point in the region between the Loire and the Garonne and southeastward and eastward to the Mediterranean zone and the right bank of the Rhône; the Alps group which commanded the left bank of the Rhône and the areas in the rear of the enemy at Nice and Marseilles; the East-central group (Jura-Morvan, Vosges) which was to extend its zone of influence till it reached the great strategic lines of communication connecting France and southern Germany, and, finally the Paris group. This group was to have the task of sabotaging the control installations of the occupation forces and of their transportation systems until our armies arrived. They were afterwards to hurl themselves into



LIAISON GROUPS
Figure 1.

SPECIAL AIR SERVICE TROOPS
Figure 2.

COMBAT GROUPS
Figure 3.

the battle of liberation, to prevent the enemy from entrenching himself in the Capital, and to protect the city from the demolitions the Wehrmacht had planned.

This plan of organization gave our Allies a fairly clear picture of what the French Command proposed to accomplish with the help of the Resistance forces. It meant to obtain rapid control of half of the soil of France; active participation by the southern maquis, in the Mediterranean operations, and indirectly it would play a part in the landing on the shores of the English Channel, and the liberation of Paris, almost without striking a blow.

The Supreme Allied Command accepted the plans as formulated.

The French and Allied Commands provided for three types of activities in order to help the paratroops assigned to the Resistance:

1. Liaison activities were to be carried out by teams composed of a French officer and an American or a British officer, equipped with a radio. There were 900 of them ready on D-day. They were to establish contact with all new Resistance groups that should come into existence after D-day (Figure 1).

2. Command and Cadre Groups, to be dispatched to those regions where the Resistance appeared to be insufficiently organized. Two regiments of British paratroops and two battalions of French paratroops were made ready for this purpose. They were called Special Air Service Troops (Figure 2).

3. Combat Groups or *Operational Groups*, to be used for surprise attacks on certain objectives or larger units and to reinforce insurrectional movements (Figure 3). Each group was composed of four officers and thirty men.

The Battle of Liberation

The action began with general sabotage. The interruption of railroad lines by the Partisans and by the Allied Air Forces, and the operations of the engineers of the FFI were so concerted as to create the most inextricable blockade of railway lines ever recorded in history.

In Brittany, on D-day, Combat and Liaison Groups landed in order to assist the local organizations. Within a few days 2,900 Patriots were armed and three operational bases were established in Brittany in Morbihan, and Côtes-du-Nord. Toward the end of June, the FFI informed that there were no more railroads capable of operation in Brittany. They also helped the American Third Army in its breakthrough operations.

On 9 August, uprisings took place in the northern part of Loir-et-Cher. By 12 August, Vendome had been liberated. The FFI were at the gates of Blois. By 15 August, the Department of the Orne was cleared of the enemy and 1,000 prisoners were taken. On 19 August, the Resistance troops entered Chateaudun with the Allied troops.

On 14 August, the Mediterranean landing, "Anvil Operation," started. The leaders of the Resistance in the south of France had become convinced that a rapid advance over the Napoleon Highway, in the direction of Grenoble, by-passing the principal routes in the valley of the Rhône, had become possible due to the strength of the partisans in these mountainous regions. One of these leaders had succeeded in reaching the headquarters of the Seventh Army in North Africa to convince the Allies of the advantages of the plan.

After the landing, when motorized troops advanced at top speed over the Napoleon Highway, the FFI protected their right flank in the valleys leading to the passes of the Alps. By 20 August, all of the Haute Savoie and a large part of Savoy and the Ain had been liberated by the FFI. Inside of Lyons, and north and south of the city, the uprisings added to the threat of the advance of the Seventh Army, which forced the Germans to evacuate the city. Thus, the defense of the Rhône Valley, which would have given the Wehrmacht such favorable opportunities for delaying operations, proved to be impossible.

Thus, in all its actions the Resistance movement was guided by a perfectly clear and very simple military doctrine, inspired by the sound common sense of the populace and based on plans worked out in accordance with shrewd, strategic foresight.

Tanks in Burma

Digested at the Command and General Staff School from an article in "The Tank" (Great Britain), February 1946.

WAR is fought in ever-changing conditions against an enemy always improving his equipment and methods. To beat him we must constantly review the relative efficiency of our weapons, and our tactics for the theater of war in which we are fighting.

Cross-Country Mobility

In Burma it was found that tanks could, and in fact did, climb the most inaccessible places, when they could not otherwise get their guns to bear on the enemy position. A high wading level, and a light track pressure for heavy tanks would to some extent counterbalance the disadvantage of their inability to cross light bridges, by enabling them to get through most diversions.

There were, of course, other obstacles and difficulties to be overcome, such as demolished bridges, low cliffs, and paddy "bunds." These had to be "bulldozed" level to make a road down which all vehicles could pass. Our ability to "bulldoze" our own roads rapidly across country, presented a difficult mine-laying problem to the Japanese, in the location of their fields, giving us a considerable immunity to them—as we seldom used the ordinary roads for tactical purposes. There was thus time for the latter to be swept, before they were necessary for supply.

Maintenance of the Force

One of the greatest problems that had to be faced was the supply of such large forces, down a single road. This would not have been possible, had not the principle of "free running" been strictly adhered to. It enabled the road to carry more than double the amount of traffic that would otherwise have been possible. Had we depended upon the road alone, for our lines of communication, our forces would never have reached the Burma plain, as the capacity of the road would have been fully used to supply the troops necessary to protect it.

Air supply made good this deficiency, but would not have been possible, had we not had control of the air in the theater of operations. This control was gained early, and enabled us, by means of air supply, to achieve three things. Our leading troops were able to outflank the Japanese, and cut their lines of communication, without themselves having to do without supplies. It reduced the amount of road traffic that would otherwise have been required to bring up the supplies, and it delivered those supplies, with great flexibility, both in time and space. In the later stages large forces were supplied completely by air having no land or water communications whatsoever.

Other things besides the degree of resistance offered by the Japanese affected the rate of our advance. They were the rate of route construction and improvement including that of roads and "paddy" fields. and of those made impassable by heavy rain. Time was necessary to mop up isolated pockets of resistance, potentially dangerous to our lines of communication. Air supply was affected by the weather, and/or the condition or absence of landing grounds. Supply dropping was not as efficient for certain purposes. It was not used, except in extremity, for such loads as the heavier types of tank ammunition, on account of the high proportion of damaged rounds that resulted.

Generally speaking, rates of advance by formations as low as brigades, did not exceed that of infantry on foot, by whom, of course, the campaign was largely fought. General purpose transport was used, on many occasions, for specific tasks such as "lifting" infantry battalions about for tactical reasons, or in order to save them from fatigue. Infantry were often carried to the forming-up area on tanks. Over all, however, movement was very slow.

The Tactical Aspect

The fighting was mainly of four types. Firstly, actions in which we were on the de-

fensive. Secondly, after we had regained the initiative, those in which we attacked the Japanese in strongly defended areas. Thirdly, after we had forced him to retreat, against his rearguard screens. And fourthly, after we had broken into these, against his disorganized remnants attempting to escape. Our defensive actions were more or less normal.

Our attacks against organized defenses consisted of finding out where the Japanese intended to make a stand, and then of massing overwhelming fire against that point, in support of as many troops as were deemed necessary (or more often as it was possible to deploy, owing to the nature of the ground).

In exploitation of success we patrolled to locate the enemy, pinning him when found, and if the nature of the ground allowed tanks to approach, mounted a coordinated tank and infantry attack to destroy him there. In the majority of actions therefore, we were mounting an attack by all arms against the enemy in good defensive positions. This depended for its success primarily upon material rather than manpower, and attacks, on this account took a considerable time to mount, if success were to be guaranteed.

It was necessary to redress the advantages that the enemy obtained from the defensive —in a very defensible country—by using fire support aimed at "destruction" rather than "neutralization." Arms that were capable of this, were the dive bombers—all forms of fighters, including those firing rockets—medium guns—antitank guns (not often used), and last, and perhaps the most decisive of all—tanks. The reasons for the need for so much fire support lie among a great variety of factors. These were:

The Japs' determination to fight to the last. This must be considered as one of the biggest single factors throughout the fighting.

The concealment given to the defender by scrub or jungle cover, because the attacker required time to locate his adversary, and the delay so caused, gave the defender time to kill him, the latter being only exposed when he wanted to shoot, and no part of him while throwing grenades. Meanwhile, his opponent was necessarily standing above ground, and even if he found his enemy, it was hard to wound him, on account of ground protection, provided by the foxhole, etc. Add to these factors, the presence of belts of sharpened bamboo stakes, set up at 45 degrees, precipitous ground, that can only be climbed on hands and knees, and often deep *chaungs* bordering the position and the abnormal strength of the defense is easily understandable.

Counterattacks

The Japanese also learned to counterattack as soon as our troops had arrived on the objective, in one or more of three ways.

Firstly, by artillery, mortar, and grenade discharger fire, which he was quite capable of bringing down on his own positions, while his men were still in them.

Secondly, after we had gained a footing by machine-gun fire on the now exposed position whose bunkers had been destroyed by our fire, from some concealed position outside it.

Thirdly, by a suicidal counterattack against our troops who had not had time to "dig in."

From these factors it is understandable that normal artillery and machine-gun neutralizing fire was of little use. The problem of keeping the enemies' heads down only arose when our troops were virtually in their position. There was, therefore, a paramount need for some weapon, right forward with the infantry, itself immune from enemy small fire, which would destroy the enemy in his earthworks. Various types of tanks met this requirement adequately.

The battle itself is closely affected by the preliminaries which necessarily precede it. These are reconnaissance, planning, and battle procedure. In the event, attacks were compromised, and much time and effort was wasted due to imperfections in these three things.

In the country in which we operated, and especially during the mobile phases, the forward tank reconnaissance, had to be continuous, and as many-sided as possible. (By this is meant all forms of reconnaissance, in all probable directions of movement.) It

covered two main aspects, the general tankability of the country and detailed reconnaissance of selected routes, and of pieces of ground for specific attacks. In addition, a continuous study of air photographs, in relation to the next phase of operations, combined with a careful assessment of intelligence reports, was of the utmost value.

Reconnaissance, prior to coordinated attacks, cannot go beyond a certain point on account of enemy interference. During action, after the tanks reach this point, they must employ the utmost caution, as regards ground, mines, etc., if they are to avoid being put out of action. This, unfortunately, occurred unnecessarily all too frequently. They had, therefore, systematically to reconnoiter ground throughout the attack, either by observation from within the tank, or with the aid of infantry on the ground. The latter can give an enormous amount of assistance in this way.

Throughout the almost entire campaign, in our experience, commanders gave tanks the consideration due to infantry support weapons of comparatively minor significance and not comparable with that which they gave to the guns. Although the former were, for reasons already given, perhaps the most important single contribution to the success of any action in which they took part. Tank commanders were seldom given the commander's appreciation, and then asked, how, where, and in what numbers, the tanks should be must usefully employed. Infantry commanders, on several occasions, allowed insufficient time for maintenance and replenishment of tanks, and for the rest required by the crews. This was due to ignorance of conditions inside a tank in action rather than thoughtlessness.

This implies the procedure that has to be followed by all arms and their commanders, in order to carry out all the actions that are necessary to launch troops into action correctly, in the shortest possible time. This latter qualification is most important, because it is when time is short, and it usually is, that troops are most often incorrectly put into action. And the criticism that "there was not enough time" is then made by subordinate commanders; when, in fact, there was ample time, but it was not used to the best advantage, and, when in fact, it was wasted by bad battle procedure.

Infantry battle procedure may have been first class, and tank battle procedure fair, but tank-infantry battle procedure, as such, was often negligible, mainly due to the absence of practical training together prior to operations.

It is just as important for tanks and infantry during training to have perfected their battle procedure and their tactical cooperation, as the latter is to a great extent dependent on the former.

There were several instances of tank hunting, varying from the bayonet attack on armored cars to a well-organized assault employing pole charges, magnetic mines, and incendiary bombs. One optimist managed to kill a commander and a gunner in the turret with a sword. Generally speaking, these close assaults on tanks were unsuccessful, and in most cases a heavy price was paid for the attempt.

Coordinated attacks

Almost every action in which tanks were involved took the form of coordinated attacks by all arms on positions well prepared and most gallantly defended. Such positions possessed a high degree of immunity from ordinary artillery concentrations, whether at saturation level or not.

The form of aerial attack now known as an "Earthquake" even if it failed to hit the bunkers, often succeeded in stunning the defenders effectively. It had, however, a very serious disadvantage—it was unreliable in timing, and sometimes in accuracy, and it was necessary for this latter reason to withdraw our forward troops as much as 1,000-1,800 yards from the target area, before bombing could start. On the whole, in view of the weight of explosives dropped, they were astonishingly ineffective, from every aspect other than that of blast.

Attacks by rocket-firing, etc., fighters and "Thunderbolts" were much more accurate,

and the infantry were able to remain much closer to them. They, therefore, served to fill the gap between the "Earthquake" and the artillery concentration. At other times, when delivered from a "cab rank" at opportunity targets they were also of the utmost value.

The guns covered the interval while the tanks and infantry closed with the enemy position from their safety zone. On several occasions it was found, however, that, as our forward troops withdrew to a safe distance from the "Earthquake" area, the enemy followed them up closely, occupying their old positions and successfully escaping from the full effect of the "Earthquake" which then came down on his empty positions. He also achieved a considerable degree of surprise, by firing at us from these positions.

The tanks and infantry now continued towards their objective until pinned down by fire. The tanks had to locate the enemy machine gun, etc., and then destroy it.

Some infantry commanders preferred to reduce the artillery concentration to a minimum, and to rely for success upon tank and infantry cooperation to gain the objective. The more accurate the fire support, such as that of tanks as opposed to guns, the more closely could the leading infantry follow it up, and so cut down the interval in which the Japanese had time to recover. The tanks could close with and destroy an enemy post, without the necessity for any withdrawal by the infantry, for safety reasons.

In other forms of attack, however, the tank did not have this superiority over other arms in fire support. Artillery fire, owing to its great flexibility in application, its power of concentration, and the fact that it can be applied on any ground within range, irrespective of its nature, makes it much superior to tanks. It is never realized by other arms quite how much work and time are required to move tank formations across difficult country.

The RE's [Royal Engineers] did valuable work, tactically and administratively, in opening up routes for tanks, sweeping minefields, and making river crossings. For mobile columns, bridging tanks were invaluable.

It is here worth noting that a regiment of light tanks per brigade of "heavies," would prove most useful, to cover the many occasions when armor is required in support of infantry, but ground or bridges preclude the employment of heavy tanks. There is little doubt, also, that while operations are in a fluid state, the presence of armor leading the force down the main axis, does considerably accelerate the advance. Light tanks are superior to everything else in this role.

Conclusion

It is hoped that a fairly comprehensive picture has been paintd of most aspects of this campaign from the Tank Regimental aspect, and that it does give a fairly true picture.

It is hoped that it has revealed certain weaknesses, and has drawn attention to the weapons that are most efficient and economical in achieving success. Efficiency and economy in material reduce the strain on the types of lines of communication on which we depended. Special attention has been drawn to the need for very high morale, good leadership, and close cooperation between all arms of the service in training before operations.

You should always be an example. Always demand much more from yourself than from your soldiers. Keep up a stern discipline, but remember that orders and severity alone do not mean everything where one dies a hundred deaths. Masterful, calm, advice with a touch of humor, and appeal to honor and comradeship help in many cases; in others it is done through lightening their heaviest burdens by inventing new expedients. Do not use big words. We understand and help each other as man to man, comrades and friends. That's the only way you will lead your company here, my friend.

A German battalion commander's advice to a new lieutenant reporting for front-line duty.

Reconnaissance in Large Cities

Translated and digested at the Command and General Staff School from a Russian article by Major Velenetz in "Krasnaia Zvezda" (Red Star) 10 October 1945.

THE experience gained by the Soviet forces in the conduct of reconnaissance in the battle of Berlin possesses unquestionable interest and suggests the forms and methods to be employed by reconnaissance scouts when operating in the streets of a large city.

The training of scouts.—Before the attack on Berlin, a few weeks before the decisive battle, preparatory measures were carried out, directed toward the training of scouts in reconnaissance activities under new circumstances and under the conditions of street fighting. All organic reconnaissance units were built up to full strength. Rifle platoons and companies formed reconnaissance parties from four to six men each, with experienced scouts in charge. Conferences for the exchange of battle experiences were held, and those attending these conferences discussed their experiences in Stalingrad, Orel, Gomel, and other large cities. In addition to this, a reserve of officer observers was created in the headquarters of the division.

Observation.—Observation was the basic form of reconnaissance. The officers' observation posts, especially, obtained a great deal of valuable information. To avoid frequent forward displacements of observation posts, the observers established their posts some twenty or thirty meters from the enemy. Later, the network of observers was enlarged about three times and so-called "roving observation posts," sent out for a few hours on specific missions were extensively employed.

In the selection of locations for observers, preference was given to tall and solidly constructed buildings with an adequate field of view. The scouts established themselves in the ruins of houses, in the attics of buildings, and on factory chimneys. The suitability of factory chimneys for observation led to their wide employment in subsequent days of fighting in the Berlin area when our forces were approaching the center of the city where tall structures interfered with observation from the attics of buildings. Since these chimneys were higher than all neighboring buildings, it was possible to see far into the enemy's dispositions.

Two or three observations posts were established by the division commander. The auxiliary (officers') observation posts were also located in the direction of main effort or where the situation was complicated. It was occupied by experienced officers who had previously been trained for this work.

The role of the auxiliary observation posts can be shown by means of an example such as the following. Two infantry companies of one of our battalions advanced a considerable distance ahead, but the third company was unable to dislodge the Germans who had established themselves in a solidly constructed corner building. The building was put under observation from six different points. Four times the third company attacked the building, supported by powerful artillery fire, and direct hits were scored on the machine-gun nests. But as soon as the artillery ceased fire and the company approached the building, the enemy's weapons came to life and the assault was broken up. The Chief of Staff of the division, who personally conducted the operations of the third company, ordered me to organize an officers' observation detail. He recommended that I detail a group of officer reconnaissance scouts and relieve them, at their observation post, every twenty minutes. At first I did not fully understand the reason that dictated so frequent a change of officers. The four officers detailed as observers were relieved promptly every twenty minutes.

At 1630 o'clock, the officer in charge of the post was relieved, and as soon as our artillery opened fire on the building occupied by the enemy, the new observer noted that the Germans began running down the stairway from the second floor into the basement. The observer began more attentively to watch

the winding stairway which he could see through a hole in the wall. As soon as the artillery ceased fire, the Germans began to hurry out of the basement and take their places. The riddle was solved. The results of the observation were immediately communicated to the battalion commander. The latter gave orders to bring out three direct-laying guns, and all their fire was concentrated on the stairway. Within ten minutes, the third company had taken the building without suffering a single casualty. In the basement, which was blocked with brick, our men seized forty-five German soldiers.

This method of observation—with its frequent changes of observers—proved extremely wise. The observer becomes so fatigued in the course of the usual two-hour shift that he fails to note every change that occurs. The success or failure of an attack has often depended just on the sharpsightedness of reconnaissance scouts. After this we began to make use of this method of observation more frequently, and it always gave satisfactory results.

Night raids.—The organization of a night raid in city streets is much more complicated than in the open terrain. The routes of approach to the objective are limited. The enemy manifests increased vigilance. There is little time for preparation and organization. Continuous fighting, which is seldom broken off even at night, is in progress. All this hinders the scouts, robs them of their field of action, and renders their operations difficult.

But in spite of this, the reconnaissance scouts found the objectives for their raids. These were German sentries, observation posts, or separate security detachments in isolated buildings. Raiding parties were first taken into the areas of impending operations. There they were familiarized with the area and assigned their missions. Subsequently, the scouts established their own observation posts, studied the routes of approach and watched the enemy.

Openings in the walls of buildings, courtyards surrounded by brick walls, and large sewer pipes served them as routes of advance. They did not move through the streets. With old rags wrapped around their footwear or thick socks pulled over their leather boots, they moved to their objectives and seized prisoners noiselessly and without a shot. The men worked with knives, and when necessary with pistols and antitank grenades.

Ambushes.—This form of reconnaissance was most frequently used by rifle units. When the enemy started withdrawing, he made use of underground routes of communication (sewers, subway tubes, etc.), in order to send diversionary groups into the rear of the attacking Soviet troops or simply left them behind. These groups crept out of the underground passages, took possession of buildings already cleared of the enemy, and fired on our men in the rear areas. To cope with this, we organized special ambushes. These ambushes were located in the vicinity of all subway stations, the entrances of basements, and large openings leading to sewers. The men placed in ambushes watched these openings and destroyed all enemy groups attempting to come out onto the surface. When the infantry units advanced, ambushes were taken over by engineers. The latter blocked all dangerous openings by the use of explosives, thus depriving the enemy of underground passages.

Reconnaissance in force.—Its practicability in street fighting is very limited. Therefore, only small attacks were carried out by fairly small groups on isolated objectives. In some cases, reconnaissance scouts were sent out to capture a building which then was held till the rifle units arrived.

The speed required for this type of attack called for special training. Our scouts had to learn how to make their way past street barricades, how to climb into windows, how to rapidly climb and descend stairs, how to use submachine guns and hand grenades in their struggle with the enemy in the rooms, how to accurately hurl hand grenades through windows or holes made by shells, etc. Success was achieved as a result of the impetuosity of the attack and, especially, the ele-

ment of surprise. If surprise was not achieved, the scouts suffered failure. And this is easily understood. They won their victory not by means of numbers, but as the result of speed and superior skill.

For this type of reconnaissance, groups of from ten to twelve, at the most, fifteen men, were chosen. They were divided, according to their functions, about as follows: an attack group of six to eight men, consisting of the most daring and fearless fighters, and the group for the capture of prisoners (three to four men). There were also included one or two men for the collection of German documents. They were armed with hand grenades, knives, and submachine guns. At the beginning of the operation, the direct-laying artillery opened a concentrated fire on the objective and shelled adjoining buildings. About ten rounds were fired within a few seconds. This was done in order to cut off the enemy's observation. After this, the scouts threw four or five *Panzerfaust* projectiles in the direction of the objective and immediately rushed into the building. The group remained there till the arrival of the rifle units or set fire to the building and left.

It should be noted that our reconnaissance scouts, in spite of the difficulties in the way of organization and conduct of reconnaissance in Berlin, accomplished their mission successfully. They uncovered the plans of the enemy and often frustrated their execution, and through their boldness, courage and fearlessness obtained information that was indispensable to the command.

The Seizure of Monte Castello by the Brazilian Expeditionary Force

Translated and digested at the Command and General Staff School from an article in Portuguese by Major Nelson R. Carvalho in "A Defesa Nacional" (Brazil) December 1945.

ON 17 February, the 1st Expeditionary Infantry Division received from the IV American Corps the initial mission of capturing Monte Castello, a part of a vast preliminary operation connected with the spring offensive against the principal organized enemy positions in the Apennines. For the Expeditionary Infantry Division, the operation comprised three distinct phases: (1) the attack on Monte Castello and the supplementary operations following it against La Serra-Bella Vista; (2) the operation which supplemented the attack of the 10th Mountain Division (American), and (3) the attack and capture of Hill 702 and of Castelnuovo.

The initial joint attack of the 10th Mountain Division and the 1st Expeditionary Infantry Division was to advance along the Monte Belvedere—Monte della Torraccia—Monte Castello region. The position had the approximate form of a "Y," its right arm bent and extended and running from southwest to northeast. The three extremities united in the elevations of Monte Belvedere in the southwest (1139 meters), with two of the extremities ending in Monte della Torraccia (1082 meters) in the northeast and Monte Castello (977 meters) in the southeast. It was important in two respects: that from this vantage point, our zone could be observed over a radius of many miles, and that the enemy was established there, astride the routes of approach to Bologna and Modena.

The enemy was well organized. His positions were equipped with strongly protected pillboxes that were invisible at a distance of a hundred meters. They possessed magnificent fields of fire and were accurately placed with respect to the routes of approach that would have to be followed in penetrating the enemy position.

The 10th Mountain Division was to take Monte Belvedere and continue along the crest as far as the line: Capella di Ronchidos—Mazzancana (the connecting point in the crest where the three arms of the "Y" meet). From there, in a joint operation with the 1st Expeditionary Infantry Division, which

was to occupy Monte Castello, it was to attack the Monte della Torraccia. Consequently, the Expeditionary Infantry Division organized its attack as follows: At the opportune moment (in liaison with the 10th Division), it was to attack Monte Castello by way of the southwest slopes. It would then be in a position to increase its efforts or exploit its success in the direction of the heights northeast of Monte Castello.

The 10th Mountain Division on the night of 18-19 February in a surprise attack with one battalion seized the heights of Piso di Campeano and of Monte Cappel Buzzo and, on the following night, began the attack against Monte Belvedere, rapidly gaining possession of it. The attack continued on to Monte Gorgolesco, then advanced along the ridge and reached the line: Capella di Ronchidos—Mazzancana. From this point on, the Brazilian force unleashed its attack, employing the 1st Infantry Regiment against Monte Castello, with the 3d Battalion of the 11th Infantry Regiment in reserve; the 2d Battalion of the 11th Infantry, engaged in diversionary operations in the Bombina and Monte del Oro area, supported by all the division artillery, and having one company of the 9th Engineer Battalion attached. The Liaison and Observation Squadron of the Brazilian Air Force played a prominent role in this attack.

The 21st was a decisive day for the Expeditionary Infantry Division. The American successes on Monte Belvedere and Gorgolesco required the capture of Monte Castello at any cost. At the appointed hour, the attack started and developed with the inevitable reverses and fluctuations. The 1st Battalion of the 1st Infantry Regiment advanced to the summit, while the 3d Battalion of the same regiment held the line they had reached, facing powerful enemy strongpoints. The arduousness of the task of the 10th Mountain Division, however, forced its troops to turn left or westward and assume a lineal formation facing the enemy and flanking their advance. As a result, it was impossible for this unit to continue its operation as planned, that is, in the form of a simultaneous attack on Monte della Torraccia. The Expeditionary Infantry Division, however, could not stop its attack which was now in progress in accordance with orders of the IV Corps. This circumstance demanded greater and more energetic action on the part of our soldiers. The advance was resumed, and at 1120 there occurred a certain confusion, the 1st Battalion encountering unexpected resistance which should have no longer existed and at points where the plans called for supporting units. Proper measures were taken, however, without losing time, and the advance continued at 1430. On the other hand, supported by concentrations of our artillery and with their action tied in with that of the advance of the 1st Battalion, the 3d Battalion of the 1st Infantry Regiment assaulted and captured the strongpoint at Fornelo. During this operation, the 2d Battalion was also sent into action. Finally, at 1720, Monte Castello was in our hands and mopping-up operations started.

The 1st Infantry Regiment took up positions on Monte Castello and from there supported the operation of the 10th Mountain Division. The enemy counterattacked several times, but was always repelled.

One of the most impressive chapters in the operations of the Brazilian Expeditionary Force in Italy was the fact that Monte Castello had been four times attacked unsuccessfully by the Allies during the hard winter season and had become a dominating symbol of Nazi power. To us, Monte Castello signified an entire winter's warfare in the frigid Apennines, from the slopes of Monte Belvedere to Monte Soprassasso and Riola; the activities of night patrols and the watchfulness maintained by our artillery and our staff.

Victory in the War of 1939-45 was won not only on the battlefield, on the sea and in the air, but in the workshops and factories of the Allied Nations.

Rt. Hon. Oliver Lyttelton

German Aeronautical Development

Digested at the Command and General Staff School from two articles in "The Aeroplane" (Great Britain) 5 October and 12 October 1945.

THE history of the German aircraft industry during the war is one of ceaseless endeavor to overtake and hold technical superiority over the Allies. In spite of all that German industry and ingenuity could contrive, the fact remains that German aircraft, even in the earliest days of the war, could not wrest air supremacy from Britain and, later, from the Allies.

It is obvious that the German aircraft and engine designers suffered mainly from the lack of coordination and direction from above. They appear to have been engaged in frantic competition with each other to produce a weapon which would overcome Allied superiority.

Single-Seat Fighters

Single-seat fighters were by far the most important category in Germany during the later phases of the war, and the most interesting from the technical standpoint.

Apart from the jet-propelled types, the Germans used only two basic designs of single-seat fighter, whereas the Allies employed at least a dozen. Standardization of the Me 109, and the FW 190 was an excellent thing from the viewpoint of production and maintenance, but, to offset the progressive modernization of the Spitfire and the introduction by the Allies of new fighter types, ceaseless improvement was imperative. This is particularly well illustrated in the case of the Me 109, now about ten years old. In 1937 the Me 109A had 500 horsepower and was slower than the Hurricane. At the end of the war, its most modern descendant—the 109K—had nearly 2,000 horsepower, was about as fast as the Mustang, and had ten times the fire power of the original airplane.

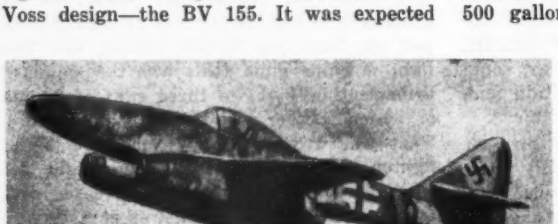
In conjunction with the GM 1 (nitrous oxide) and MW 50 (methanol) power boosting systems, engine and airframe improvements enabled the Me 109 throughout the war to tackle our fighters at least on something approaching equal terms. But high performance was not all that was demanded. The American daylight heavy bomber offensive called for heavier fire power, so the armament of the Me 109 was gradually stepped up from one 20-mm cannon and two light machine guns (this was the standard armament in 1941) to three guns of 20-mm or 30-mm caliber and two of 0.5-inch bore. That was a very heavy load for a small fighter, and its resistance and weight detracted appreciably from the increased performance allowed by the newer engines and power-boosting systems.

As an alternative to the wing guns on the Me 109, a pair of 21-cm rocket projectiles were sometimes hung below the wings for attacking Fortresses and Liberators. At one time this armament seemed menacing, but proved inaccurate.

The introduction of the radial-engined FW 190A in 1942 gave the Germans a temporary superiority in performance at medium height. This outstanding type remained in service until the end as a general purpose fighter, bomber, and low-level attack airplane. It was capable of carrying a 4,000-pound bomb, but a more normal load was a 1,000-1,500 pound. Its armament and handling characteristics were admirable, but poor altitude performance was a very serious drawback. Towards the end the FW 190 was fitted with a liquid-cooled Jumo 213 engine. This was the so-called "long-nosed 190" or the 190D. Eventually it was completely redesigned as the TA 152, virtually a new type. This TA 152, although not so spectacular as the jet fighters, had an excellent performance—particularly one version known as the 152H. This aircraft had an amazingly long wingspan—nearly half as much again as the Spitfire. This feature, together with the two-stage supercharger of the Jumo 213 engine, gave it a very high performance at altitude. The top speed was over 460 miles per hour at 41,000 feet. Kurt Tank, the designer,

whose practice was to fly all aircraft of his own design, tells with some satisfaction how, when testing a TA 152H a few weeks before the collapse, he outstripped a flight of pursuing Mustangs. It was coming into service when Germany capitulated.

An even more remarkable high-altitude fighter under development was of Blohm and Voss design—the BV 155. It was expected to attain its top speed of nearly 430 miles per hour at over 50,000 feet—above the ceiling of present-day fighters.



Teutonic Meteor.—The Messerschmitt Me 262 in flight.

Sufficient has already been published to show that the Germans were quick to appreciate the advantages offered by jet propulsion. The term "jet propulsion," it should be remembered, covers not only turbo-jet units as used in the British jet fighters, but liquid rockets, almost exclusively a German development. The first jet-propelled airplane to fly in Germany—or, for that matter, in any country—was a Heinkel, the He 178, a counterpart of our Gloster-Whittle. This little single-seater made its first flight on 27 August 1939—four days before the Germans marched into Poland. The 178 had an experimental Heinkel turbo-jet unit with a thrust of only 1,000 pounds. It was purely a flying test bed and was not developed for military purposes. But it did provide useful data for the construction of the twin-jet He 280 fighter, which flew in 1941.

Work on the Me 262 (known also as Sturmvogel) was started in 1939, and it flew in 1940 with a single Junkers Jumo 211 in the nose. In 1941, two Heinkel turbo-jets were installed, but the airplane did not take off, as it was found to be under-powered. In July 1942, Junkers jet units were installed and an intensive development program commenced. The standard Me 262A single-seater, which was in service at the time of the collapse, had a top speed of 525 miles per hour at 23,000 feet, and a service ceiling of just under 40,000 feet. It carried over 500 gallons of fuel and was armed with four 30-mm guns. The bomb load was 500 or 1,000 pounds. Handling qualities, considering its high performance, were good, and the landing speed not unduly high—about 120 miles per hour. This emphasis on rapid climb became increasingly apparent towards the end, and highly specialized rocket-propelled interceptors of various designs with extremely short duration were under development.

One type actually went into service several months before the collapse. This was the amazing little Me 163B "Komet," a semi-tailless design, capable of a level speed of about 550 miles per hour and able to climb to 30,000 feet in just over two and a half minutes. The Me 163B normally took off under its own power, jettisoned its wheels, and landed on a skid. It was armed with two 30-mm guns and was built partly of wood. In order to increase the endurance, a later model, the 163C, had a special rocket unit incorporating a second jet to give cruising economy. The endurance under power was about 12 minutes, and the maximum speed 590 miles per hour. The development of the 163 was finally taken over by Junkers, who designed an airplane of similar characteristics which they called the Ju 248 (later the Me 263). This Me 263 was designed to climb to 49,000 feet (far above the operating height of our bombers) in three minutes.

Rocket-propelled interception of this sort were comparatively quick and cheap to build, but were very seriously handicapped by their short endurance in the air. It was accordingly decided to produce a cheap fighter with a lower performance and a longer duration,

and the airplane which we now know as the He 162A, or Volksjaeger—the People's Fighter, was developed. British investigators have examined and flown a number of these Volksjaeger. They are largely of wooden construction, have a tricycle undercarriage, a catapult seat, and are powered with a single BMW turbo-jet unit mounted above the fuselage. Their speed is about 500-520 miles per hour, and the armament, a pair of 20- or 30-mm guns. Landing and take-off are difficult for inexperienced pilots, but credit must be given to the Germans for having produced a cheap fighter with a better performance than standard types.

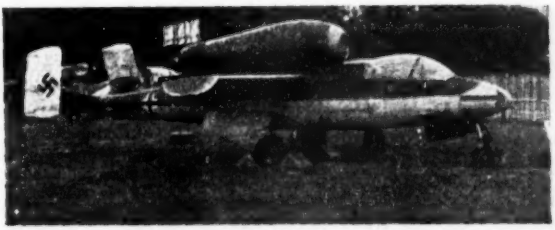
The performance of some of these German jet fighters—particularly the 163 and 263—is surprising, in comparison with the standards of 1939, but the enemy was developing a "last-ditch" project which would have made even the 163 and 263 seem sluggish. This was the Natter or Viper. Although Natter is slightly classed as an airplane because it has wings, controls, and a pilot, its proposed method of employment was such that it might be regarded as a piloted Flak rocket. The BP 20 Natter was a tiny airplane of about eighteen feet span and powered by a liquid rocket like that installed in the Me 163. It was to take off vertically with the assistance of auxiliary rockets, climb at rate of about 37,000 feet a minute, and destroy a bomber with its battery of rocket projectiles. This being accomplished, the pilot was to be ejected and descend by parachute. Simultaneously, the rear half of the fuselage containing the liquid rocket would break off and itself descend by parachute. The airplane was designed for quantity production in small wood-working shops.

The twin-engined Me 110 as an escort fighter, despite its high performance and heavy fire power, proved vulnerable to our Spitfires and Hurricanes, and was eventually relegated to home defense and night fighting duties.

The Me 110 and Do 217 night fighters, although operated for a long period against our night bombing offensive, were not nearly so popular nor so successful as the fighter variants of that excellent airplane, the Ju 88. To give an idea of what our bombers were up against towards the end, the following facts are quoted relative to the Ju 88G night fighter, which was standard equipment in the last months of the war.

First, it had modern and efficient radar equipment. As it had been developed from the Ju 88 bomber, it had an ample endurance—about five hours—and first-rate handling qualities, a very important consideration for operation at night. It had ample accommodation for its crew of three and was armed with a compact battery of four 20-mm guns firing forward and two similar guns fixed in the fuselage and firing obliquely upwards. This oblique installation—Schrage Musik as the Germans called it—was used to make surprise attacks from below. It was fitted to all types of German night fighters during 1944 and 1945. Finally, the Ju 88 night fighter had a reasonable margin of speed over our bombers. The latest version, in fact, was nearly as fast as our night fighter Mosquito, which is a surprisingly good performance for a large airplane. The Ju 388 night fighter, with highly supercharged Jumo 213 or BMW 801 engines, which was about to be issued to night fighter units, could carry a heavier armament load and also had something approaching Mosquito performance.

Another fast twin-engined night fighter which was just coming into service was a Focke-Wulf type, the TA 154, often known as the German Mosquito. This not only re-



Utility Jet.—The Heinkel He 162A was popularly known as the Volksjaeger (People's Fighter).

sembled the Mosquito in general appearance (except that it had a tricycle undercarriage) but it was also built of wood.

It soon became apparent to the Germans that if they were going to catch our Mosquitoes at night they would have to use aircraft of exceptionally high performance, and they planned to operate two-seater night fighter versions of the Me 262 and Ar 234 jet-propelled aircraft in addition to a two-seat night fighter version of the Do 335. A few squadrons of these aircraft would, of course, have been an embarrassment, but they did not materialize.

Bombers

At the beginning of the war the standard German bombers were the He 111, Do 17, and Ju 88. The Do 17 soon disappeared from service, but the He 111 and the Ju 88 remained to the end. Their bomb loads were comparatively small, but the He 111 was successfully adapted to carry a single flying bomb externally. The Ju 88 was developed into the Ju 188, with improved crew accommodation and better performance, and eventually into the 388. The 388 bomber was a promising airplane which would eventually have been fitted with two of the big 24-cylinder Jumo 222 engines. It was calculated that these would have given it a speed of about 430 miles per hour at over 37,000 feet.

The He 177 was not, as many people believe, the only big bomber developed by the Germans. Junkers had designed a bomber version of the four-engined Ju 290 and the six-engined 390. The 390 was originally produced as a transport and was a very impressive airplane in size and carrying capacity. It was more than half as big again as the Lancaster and carrying 7,500 gallons of fuel, had a theoretical range of nearly 5,000 miles. The bomber version was to be armed with ten 20-mm guns in turrets.

Farman, in France, was developing for Heinkel the He 274 four-engined high-altitude bomber with pressure cabin—the last of a series of experimental high-flying bombers which included the Ju 86P and R which operated ineffectively against this country in 1942, and the Hs 130 which had an engine in the fuselage to supercharge the two wing engines.

Messerschmitt's big bomber was the He 264, which looked rather like a large slim Liberator and was designed to bomb New York. The 264 flew only as a prototype and it was intended for the attainment of maximum range at the expense of armament and other items. To support its tremendous weight at take-off two extra wheels were fitted and were jettisoned once the airplane became airborne. There was a project to fit two jet-propulsion units in addition to the four engines to give high speed for short periods.

Focke-Wulf had also studied a big bomber—a six-motor TA 400. This was designed to carry 22,000 pounds of bombs and to be armed with sixteen guns, of which four were in a tail turret. Again, it was proposed that one version should have two auxiliary jet units to increase the emergency speed.

Jet-propelled bombers were, of course, very attractive to the Germans. The Me 262 was operated as a light bomber, but for this work it was inferior to an Arado product—the Ar 234. The version used operationally, the 234B, could carry up to 4,000 pounds of bombs, although a more normal load was about 2,000 pounds. It was rather slower than the 262, having a top speed of about 470 miles per hour, but in general was a highly successful design.

Junkers had also flown an airplane—the Ju 287—powered by six BMW 003 jet units. These were eventually to be replaced by only two units of very high output. Apart from its propulsive system, the most striking feature of the 287 was its sharply swept-forward wing, giving it the appearance of a tail-first airplane. The 287 had a maximum designed bomb load of nearly 10,000 pounds and a range of 1,175 miles with a bomb load of three tons. Its maximum speed was over 530 miles per hour.

The Battle of the Neisse

Translated and digested at the Command and General Staff School from a Russian article by Lieutenant Colonel E. Skrabis in "Krasnaia Zvezda" (Red Star) 29 July 1945.

THE breakthrough of the German position on the Neisse River, executed by our forces in their advance toward the city of Spremberg, is an interesting example of our offensive operations. This offensive took place under unusual circumstances. There was a water barrier in front of the German main line of resistance, and this called for a preliminary crossing of the river by our infantry units. This excluded the use of tanks for the assault of the German position. Large wooded areas concealed the rear of the enemy defenses, making it difficult to reconnoiter or observe them. The limited number of forest roads slowed down our maneuvers and made supply difficult. On the whole, the operation consisted of a forced crossing with subsequent engagements in the forest.

The Neisse River in the breakthrough sector was twenty to forty meters wide and one to three meters deep. Its eastern bank is sloping, while the western bank is low near the river and high farther away. The soil is sandy.

Along the entire western bank of the Neisse the Germans had continuous lines of trenches and machine-gun nests with overhead cover. At the edge of the forest, on the slopes of the hill, the enemy had more trenches and minefields. The artillery was emplaced in clearings. All along the inhabited places stretched the second line of defense, also in the form of a continuous trench. The artillery and mortars were echeloned in depth, and emplaced along the roads, in inhabited localities, and along the edges of clearings.

Tanks, self-propelled weapons, and armored carriers were widely used in the German defenses. They were employed in ambushes and as mobile fire groups firing from behind stone buildings. The Germans also used a great number of antiaircraft weapons for laying direct fire along the roads and the approaches to the woods. The antiaircraft guns, also, laid dense standing barrages, covering wide areas.

The first trench was manned by the Germans along its entire length, while in the rear of the defenses only the strongpoints were garrisoned. The enemy did not have any reserves in the rear with which to organize large-scale counterattacks or to prevent our units from advancing through the intervals between his strongpoints.

The units of our division had had previous combat experience in river crossings. After a prolonged march the division concentrated in a grove, a considerable distance away from the front. Here they trained for three days. The battalions and attached units were trained in the methods of fighting in the woods by day and by night and in crossing operations with subsequent attack and assault of fortified buildings.

For correct orientation and efficient liaison (communications) in the woods, the following procedure was adopted. The battalions set up their own identification signs. One man from each platoon was detailed to blaze trees every 100 to 150 meters and then, with a pencil, to draw the sign with an arrow pointing in the direction of advance.

Wooden boats were built by the division engineers, and at night they were brought up to the trenches. The material for the bridge was also prepared. Individual rafts and parts of assault bridges were built by the infantrymen. The chemical troops, having determined the direction of the wind, prepared to lay a smoke screen over the river.

Reconnaissance, the study of the German positions, and the preparation of the line of departure were carried out during three consecutive nights. Only observation was possible in the daytime since there were trenches on both sides of the river and any movement, even by individuals, brought forth sniper and machine-gun fire.

Units took up positions along the line of departure in the following manner: At night one of our battalions relieved the forward units in the division zone of action with a frontage of about one and a half kilometers. During the next night, a battalion of another regiment occupied the right half of the zone. This same night a company carried out a reconnaissance in force mission. It crossed the river unobserved and seized a small sector of the first enemy trench, which was held until the next morning, anticipating the crossing of the rest of the units.

Then the units of the second echelon, which prior to this were about six kilometers away, took up their new positions. Under the cover of the company that had previously crossed the river, the first battalion of one of our regiments crossed the river before dawn. The battalion had consolidated its positions by the beginning of the artillery preparation, and the division engineers had built a bridge for artillery and tanks and had cleared passages through enemy minefields.

Two regiments were in the first echelon of the division. These regiments were represented by two assault battalions and two companies. Each assault battalion had two rifle companies in the first wave and one in the second. Thus, the first wave had six companies, nine tanks, seven self-propelled guns, and sixteen 45- and 76-mm guns accompanying the infantry as assault batteries.

The second echelon of the two regiments was made up of two battalions. The second echelon of the division consisted of one regiment. This insured the necessary density of the first infantry wave, and the depth of the formation without which no gradual and steady increase of the momentum of attack would be possible.

Adequate artillery support contributed greatly to our success. Our only difficulty was the lack of information on the fortifications in depth of the position. Immediately beyond the main line of resistance the terrain was wooded and concealed the enemy. Air observation was able to disclose only a number of trenches near the populated places (i.e., second line of defense) and several batteries. Therefore, instead of a planned neutralization and destruction of targets it was necessary to fire concentrations by areas and phase lines.

Besides the divisional and regimental artillery and mortars, the operation was supported by the division artillery which was part of the second echelon of the Corps. There were also four heavy artillery battalions, one howitzer regiment, two light artillery regiments, one antitank regiment, and two mortar regiments. On one kilometer of front, there was a concentration of 320 guns, forty per cent of which were 130-mm guns and larger calibers, and twenty-six per cent, heavy guns (152- and 203-mm). Altogether, in addition to corps and army artillery groups, ten artillery regiments and three rocket-launcher regiments were employed.

Such an artillery concentration required rigid centralization of control. For this reason, the artillery preparation was planned by periods on the army level. Fifty-five artillery pieces were used for direct fire, sixteen of which accompanied the first wave as assault guns.

Six phases of artillery preparation were planned, totaling two hours and twenty-five minutes. A ten-minute concentration was to be fired upon the forward position. Systematic neutralization of known targets was to last twenty-five minutes. Another five-minute concentration on the first position was to follow. The counterbattery fire was planned for sixty minutes. The river was to be crossed under a smoke screen during the artillery preparation. The depth of the defense would be fired upon for thirty-five minutes, and a ten-minute barrage was to be laid down prior to the beginning of the infantry attack.

Rigid camouflage discipline was observed, and during daylight hours all movements toward our main line of resistance was forbidden. The movement of matériel and of personnel was conducted at night. Registration and adjustment were done by individual pieces.

As was mentioned before, a battalion crossed over before the artillery preparation

had begun. The infantry crossed during the artillery preparation. The engineers rapidly built a bridge. By the time the attack began, the assault guns had been concentrated on the opposite bank. Tanks and self-propelled artillery followed.

The enemy in the main line of resistance was almost completely annihilated by the artillery fire. Only a few emplacements remained active on the forest edge, but they, too, were soon neutralized.

But in the forest the situation was different. The enemy, employing mobile groups composed of tanks and armored carriers, stubbornly defended certain areas, houses, and populated places. The enemy artillery laid massed fires on the roads and along the edges of the forest. The scattered remnants of German forward units found themselves in our rear and attempted to fight their way back. Fires spread in the woods. All this made our advance difficult.

During the first day our division advanced eight kilometers, and five during the next day. The town of Graushtein was stubbornly defended, but it was cleared of the enemy after a twenty-four-hour siege and intensive artillery fire. To capture Spremberg, wide enveloping maneuvers were undertaken from both sides, placing the garrison under a threat of complete encirclement. Following this, our units broke into the city, thus accomplishing their mission.

The following conclusions may be drawn from this battle. The success of breakthrough operations depends wholly and completely on its planning. It is important that the battalions conduct combat training, including practice firing, together with the tanks. The training must be done in an area far from the combat zone. They should not be moved to the front until two or three days before the attack. Under these conditions, the new grouping of troops is concealed and the troops have enough time to study the enemy.

It is necessary to carry out thorough reconnaissance with regimental, battalion, and assault-battery commanders before the occupation by the troops of the areas of departure. Forward trenches should be used for this purpose. It is expedient to rehearse the various stages of the offensive, such as the action of the infantry during the artillery preparation, during the attack, and during the exploitation stage.

Engineer reconnaissance is imperative. During this reconnaissance, the battalion commander and an engineer should accurately determine the location of paths through the mine fields.

A single machine gun can stop a battalion. Therefore, during the artillery preparation, it is necessary to deliver intense and concentrated fire upon the entire main line of resistance in order to destroy completely all enemy emplacements.

The tanks should support the infantry in wooded areas following immediately behind and moving forward for short periods of firing. The artillery must be able to fire using map data only. Sending artillery forward observers into advance infantry positions is very important.

The possibility of forest fires should always be kept in mind, and the personnel must be able to cope with them.

The use of forest roads must be planned very thoroughly, for unit zones of action (advance strips) are used only by combat elements. Each division should have one road for its exclusive use if possible.

There was never a war in all history easier to prevent by timely action than the one which has just desolated such great areas of the globe. It could have been prevented without the firing of a single shot, and Germany might be powerful, prosperous and honored today, but no one would listen and one by one we were all sucked into the awful whirlpool. We surely must not let this happen again.

Winston Churchill

The Military Failure of Militarism

Digested at the Command and General Staff School from an article in "The Round Table" (Great Britain), December 1945.

A great military reputation is not established without foundation. As long ago as the first century A.D. Tacitus described the valor of the German tribes in terms curiously akin to the descriptions of the "furia francese" of the Middle Ages. More recently still any potentate who desired good mercenaries went to Germany to hire them, though soldierly pre-eminence was not generally attributed to the Germans as such before the wars of Frederick the Great—and then only to the Prussians. Before that time the palm of military virtue, since the decline of the Roman legion, was borne in turn by the Goths, the Huns, the Normans, the Saracens, the Spaniards, the Swedes, and the French. Moreover, there was something bogus even about the Prussian army of Frederick the Great, and it may well have owed at least as much to the Hitlerian unmorality of its creator as to its own innate virtues. At least it collapsed ignominiously in the next generation at Valmy, Jena, and Auerstadt. Perhaps, however, it would be right to detect the existence of potentially good military raw material among the Germans right through their history. The testimony of Tacitus has already been mentioned. Then the Franks, ultimate creators of the Latin chivalry, were originally a German tribe; and it will be observed that many French military terms are Teutonic, not Latin. Again, if we contrast the campaigns of Gonzalo de Córdoba (which were practically bloodless) with those of the Thirty Years' War (which was essentially a German civil war) it will be seen that the Germans of the seventeenth century showed a quite astounding degree of pertinacity and of ferocity in battle. Indeed, the only real parallel to the war which destroyed three-quarters of the population of Germany is the campaigns of López, the dictator of Paraguay, which destroyed six-sevenths of the people of that Republic and left alive only one male for every twenty-eight females.

But ferocity and high casualties are not necessarily a proof of military genius, and what we are discussing is not whether the Germans possess unusual military courage but whether they possess unusual military skill. Marshal Ney (whose natural language was German) was the "bravest of the brave" among the Napoleonic constellation, but as a strategist he was the lowest of the low—infinitely inferior to Davout or Berthier the Frenchmen, to the Scotchman MacDonald and, of course, to the great Corsican himself. It is the theme of this article that the Germans can be shown to have possessed less than normal military skill and not even abnormal military courage.

It is enough for the purposes of this argument to establish the fact that for nearly seven years an autocratic Government, supported by an ample and experienced military hierarchy, and able to count on the work of some eighty million industrious people, set out to forge an irresistible military instrument. They could count upon apathy, ignorance or funk upon a very large scale among all or most of their intended victims. In spite of these immense advantages, they failed. The *prima facie* deduction is that they were not really very competent.

It will, of course, be said that the odds against them became very great. For example, most German generals in the course of interrogation have complained bitterly about two things—the first being the Allied air supremacy, and the second being that the Russians were so numerous that, however many were killed, there were always more to come. But that is no answer to the charge of incompetence. If the Germans had known their job, they would have finished it before Allied air supremacy could develop, and they would never have had a war on two fronts simultaneously. Asked why Britain was not invaded in the autumn of 1940, one general explained that the Germans did not like to risk what the British Navy could

do. A thousand years of fine naval tradition certainly paid us a good dividend—for what the Navy could in fact have done was demonstrated off Crete next spring. Even assuming that the metropolitan RAF could have given some air cover in the Channel as it could not do in Crete, there can be little doubt that a resolute attack would have effected a landing, that a landing could have been met only by a most devoted but wholly inadequate defense, and that by an expenditure of a few hundred thousand men at the outside, the war in the west could have been won. Even supposing that things had gone wrong and that, for example, supplies for the invaders could not have been maintained (though they would not have needed to be elaborate), no adequate reason has ever been given why a competent military machine should not have risked it. As for Russia, is it generally realized that the Germans actually succeeded in creating a strategic situation such as Hitler in *Mein Kampf* adduced as the greatest proof of the contemptible folly of the German war direction in 1914-18. To attack on the Eastern front in June 1941 on the assumption that the Western front was and would remain phoney long enough, was exactly the same mistake (substituting Eastern for Western front) as Ludendorff made in March 1918. In both cases the essence of the error was the assumption that occupied countries or quiet fronts however cowed and quiescent do not require enormous forces to make sure that they are safe. The 1941 error was probably the more flagrant because it has yet to be shown that the Russians, if they had not been attacked, would of their own volition have entered the war.

The German generals are now frankly admitting that the overall politico-military strategy of the war was contemptible; but of course they put all the blame on Hitler from the cardinal error of attacking Russia to the final futility of Rundstedt's offensive in the Ardennes in December 1944. Without doubt Hitler's position both in law and in fact was exceptional. He was not a mere figure-head like the Kaiser. But surely competent soldiers are more than "yes-men." Some were actually parties to the plot to suppress Hitler in July 1944—at the eleventh hour, be it noted. But on the whole the German General Staff (and it was 50,000 strong) showed a lack of strategic inspiration which even Hitler's position does not excuse.

Let us examine for a moment the outstanding strategic blunder of the German military machine, which, in the writer's opinion, was the heavy reinforcement of Tunisia, after Alamein and the Anglo-American landings in French North Africa had made the German position south of the Mediterranean hopeless. The generals say that they could not get the *Afrika Korps* and the existing Tunisian garrison away and therefore the only thing to do was to reinforce. That is a very queer argument. In the first place, surely if men could be sent in, men could be taken out. In the second place, if something had to be lost anyway, why make it much instead of little? The cost was fifteen good divisions instead of four or five. If the ten or eleven extra German divisions had been stationed in Sicily or southern Italy, the "under belly of the Axis" would not have been "soft" at all. It is true that the Allies, even as it was, had a desperately difficult campaign in Italy—if not in Sicily; but we now know that their difficulties were not due to the genius of the German High Command. That Command was in fact completely deceived about the location of the landings in Sicily; and if it put up a stiff fight in Italy, so it ought to have done. For in the peninsula it always had a superiority of force on the ground—some twenty-five divisions against seventeen when the final decisive battle opened—and its force was homogeneous whereas the Allied Armies comprised seventeen different nationalities. Italy indeed seems to the writer an outstanding instance of the German strategic muddle which resulted in the absence of at least a third of their resources from the critical battles on the Rhine and the Vistula.

Space forbids any elaborate analysis of German air strategy. But it is pretty evident that the Germans did not know how to use their Air Force. Apart from the superb per-

formance of our fighter squadrons and AA batteries during the battle of Britain, the Germans lost that battle largely because they never concentrated upon one kind of objective for long enough. They switched from ports to airfields and from airfields to factories, and from factories to general terrorization without consistence or persistence. In fact, it is arguable that they knew how to use an Air Force in conjunction with an army, but not as an independent instrument. They had air tactics but no air strategy. Finally, of course, they turned the major part of their air effort away from the attempt to produce a competitive Air Force and in favor of the production of air gadgets. There is no denying the immense potentialities of the latter. If the V-1 and V-2 had been in mass production and use eighteen months earlier than they were, the result would have been very serious. If the *Luftwaffe* could have been equipped on any large scale with the new jet machines, the Germans might even have swung back the pendulum of air power—as they did once during the last war by equipment with Fokkers. They were, we are now told, within an ace of discovering how to release atomic energy. It was a race against time, and the Germans lost. Admittedly there are many reasons why this is not wholly to their discredit. It is always a moot point in war how to divide effort between waging the war of this period and preparing for the war of the next. If you concentrate too much on what you have got already, you may not win before the enemy outstrips you and turns the tables. If you concentrate too much on turning the tables, you may lose before the tables are turned; and that is what happened to the Germans. Napoleon acknowledged the difficulty when he said, in effect, that the highest quality in a general was to be lucky. What we are discussing, be it remembered, is whether the Germans are pre-eminent in the art of war or not; and in the matter of air warfare they fail to qualify not only by the test of air strategy but also by Napoleon's test.

We come now to the military qualities of the German soldier. Mr. Churchill said recently that when two forces were more or less equally matched, the quality of their leadership decided the issue. That is, of course, true. But many battles have been won by the soldierly qualities of the rank and file. Albuera and Inkerman are two that occur at once—and it is not so easy to recall any battle won by relatively poor troops. The soldierly qualities of the Germans have often excited the admiration of their enemies—and the late war was no exception. But either German leadership was even worse than has been contended in this article or the qualities of the rank and file were not generally so good as occasional experiences indicate.

But one reason for the success of the invasion (apart from the quality and leadership of the Allied Armies) was oscillation and imperfection in the German High Command. General Marshall's report shows the remarkable degree of confusion and indecision in the enemy's plans. Added to the dislocation caused by Allied bombing and the operations of the FFI (French Forces of the Interior) this chaos of thought was decisive.

Such are some of the facts which support the view that the Germans have no monopoly of military skill or courage. If that view be correct, one of the things that must never happen again is that the world should be bluffed, by the theory that they have such a monopoly, into failing to check aggression in time or to face it resolutely after it has erupted. No attempt has been made to deny that the Germans are good military technicians and more often than not brave soldiers. But they are not perfect technicians nor superhumanly brave soldiers. They are not either in the military or in the ethnological sense a "master race."

In chaplains we must not only see the spiritual directors of the Army but also friends and confidants, inseparable companions always willing to help and assist us in our homes as well as in the field of battle.

"Memorial del Estado Mayor," Colombia.

Mountain Warfare

Translated and digested at the Command and General Staff School from an article in Spanish by Major Juan García García in "Ejército" (Spain) June 1945.

THE recent creation of mountain units and of specialized commands and staffs for them marks a new stage in our army. Today, war is mechanized; level and medium terrain belongs to the tank, but if Spain were invaded, we would find our strength chiefly in mountain warfare.

We have had examples of mountain tactics in the recent war. Italy, where a few German divisions held the front, carrying on their own individual war without the enemy's being able to eliminate them; and on a smaller scale, France and Jugoslavia, where the maquis and guerrillas were able to control large areas ostensibly dominated by battle-tested and well-equipped armies.

The principles which govern warfare in level terrain, including the use of the various weapons and the organization of the command, are applicable in the mountains too, but mountain soldiers must possess exceptional qualifications.

The lack of roads, the narrowness of the trails, the difficulties of the terrain itself, and in winter the snow and ice limit freedom of movement and influence the decisions made.

In the mountains, logistics is most intimately linked with tactics and no other theater of war offers so many possibilities for maneuver and surprise. Hence, security is very important but it is not sufficient to merely take security measures; it is more important to find out where the enemy is and what he is doing.

Aggressive, well-trained troops find mountainous terrain, however rugged, the best opportunity for daring undertakings, especially by small units. In some cases, the appearance of small units in places considered as inaccessible, or at times when action is considered impossible, e.g., during snow storms, will be sufficient to achieve important results. However, not only small units are capable of operating successfully in the mountains; even large divisions or corps can operate there provided they have modern equipment which permits handling great masses of troops; though, of course, they must be given time, a thing which every command must take into account, for the preparation of all operations in the mountains requires more time than in level terrain.

It is in the mountains that the individual man and his rifle have their greatest value. Automatic weapons of flat trajectory, in combination with flanking operations that can be carried out at all altitudes, are of decisive importance. Curved trajectory weapons and artillery must be managed so that the units can count on powerful supporting fire.

Besides the units are frequently broken up into little groups, separated by insuperable obstacles. Hence, the commander often has to give instructions that will remain valid over long periods of time and permit considerable autonomy to the subordinate commands. The latter should, therefore, have a very definite knowledge of the overall plan.

Only forces that have had peacetime training in mountain operations will be able to give a proper account of themselves without previous preparation. Improvised mountain units, divisions formed of men who are not natives of mountainous regions, will always require a certain time to become accustomed to them.

In Spain we now have several types of mountain units. Namely:

1. *Technical Advisers Groups* would be especially useful in the following capacities:

a. As advisers relative to the location of shelters, suitable zones for camps, roads, trails, and communications in general, zones that are hazardous for marching.

b. In connection with reconnaissanee and the organization of positions, advanced posts, observation posts, the establishment of signal communication systems and transportation in the mountains.

c. Advising the command as to the possibilities of the operation that has been planned, as well as those of the enemy, after previous study of meteorological conditions.

d. Likewise, orienting reconnaissance for the purpose of seeking suitable places for the installation of ammunition dumps, artillery and weapons deployments, the transportation and evacuation of the wounded, etc.

e. Directing the mountain training of troops.

f. Teaching the troops of the various special branches what they need to know relative to mountain service, the care of mountain equipment belonging to the troops and the direction of rescue work in case of accident.

g. Instructing the men in matters of safety and morale in the mountains, since troops, in general, are inclined to give less importance than they should to the dangers found in the mountains.

2. *Mountain companies.* These are combat units with special missions, including scouting and reconnaissance in all seasons and conditions of the terrain. The men must possess exceptional physical qualities and practical knowledge of mountains. Normally, they are selected through regional recruiting and their natural qualifications are improved by training.

3. *Guide Units.* The principal mission of these units training, assist the rest of the troops to make their way over difficult areas, and guide them to the zones they are to reach. These units are normally distributed in accordance with tactical and local situations and only exceptionally are they to be used as combat units, for due to their specialty and the difficulties of recruiting them it is necessary to protect the men as much as possible.

In addition to these units and within the main body of the combat units, ski units are organized able to take care of liaison and reconnaissance missions. The units vary in size, somewhat as follows:

In each rifle company, a team composed of a section armed with rifles and a section armed with automatic weapons. In each battalion, a platoon composed of three sections armed with rifles and three armed with automatic weapons. In each infantry regiment, a company formed of three platoons.

These units may vary in their composition in accordance with their mission. Their employment is limited to the cases and places where speed is important and when the situation with respect to terrain, climate, and atmospheric conditions impedes action of the mountain troops.

Security, we know, depends on *information* and *deployment. Information* is obtained by means of reconnaissance, which must be organized by all units regardless of their situation or composition.

In view of the special conditions obtaining in the mountains, reconnaissance, if it is to be efficacious, must cover great distances, taking all possible advantages of the time element in order to supply the information required. Nevertheless, this reconnaissance is not to be carried out in a uniform manner over the entire front, but the command must orient it in accordance with its requirements in the direction of certain points which, usually, will be important as observation posts.

It will be well not to disregard those zones that are inaccessible, for it must always be borne in mind that the enemy may be there. But since, normally, it requires a great deal of time to reconnoiter them, it will suffice to carry out this reconnaissance in a summary and preventive manner, and concentrate on the principal mission.

In reconnaissance, daring, speed and cunning must predominate in order to surprise the enemy and avoid in turn being surprised. The commanders must be chosen from among the most capable. Likewise, the units charged with this mission should have rapid means of communication.

In order to obtain security through *deployment*, it is essential, first of all, to split up into several columns, each of which will take care of its own security, organizing for this purpose security detachments in its vicinity, which should not be very numerous, though their number may vary with the situation.

Offensive Combat. As we have already

pointed out, maneuver and surprise are the principles that must govern all action in the mountains, and this is especially true of offensive action.

The maneuver which will give the best results and which should be resorted to, is encirclement. All action that is undertaken must be preceded by a thorough study, rejecting no solution regardles of how audacious it may appear and always attempting to achieve surprise, which is even more indispensable in these zones than in level terrain. The action must then be carried out resolutely and swiftly, i.e., not only with speed of movements but with continuity in execution, with no delays or roundabout methods.

Approach March. The deployment of the forces is influenced by the accidents of the terrain and the scarcity of communications. A study of the tactical problem is necessary, in which an effort is made to take maximum advantage of the communication routes of the zone, insuring maximum opportunity for movement. Likewise, this deployment must not be very deep, must not be very vulnerable, must be ready for action, very elastic, and able to adapt itself to all contingencies.

The approach march should be expected at night, which favors the element of surprise, whenever this is possible; and in order to avoid the surprise maneuver which the enemy may employ against us, we must have good reconnaissance and a rapid advance guard that can move forward without delays and eliminate the advanced elements and detachments of the enemy until contact is established with his position or main body.

Attack. Action should be so directed as to threaten the enemy with envelopment of his flanks and rear; but if this should not be possible, and a frontal attack is necessary, the command must then remember that action of a hasty sort may lead to disastrous consequences and that the best thing to do is to wait, since only vigorous and efficacious artillery fire and the fire of supporting weapons can remove the obstacles and make success possible.

Exploitation of success. The action must be extended in depth without extending it laterally, in order to attain vital objectives, since frequently this results in the crushing of all enemy resistance. It must be immediate, bold, and concentrated.

Defensive Combat. Normally, this possesses the following characteristics: positions of slight depth but of great intrinsic value and over very broad fronts, in which the units are broken up into small groups. Owing to this, they may suffer surprises, so careful reconnaissance and security, and a perfect knowledge of the terrain are necessary.

Firing plans must be adapted to the terrain, a difficult thing to accomplish if we wish to avoid dead angles, which are very common in these zones; and in order to achieve this, we shall have recourse to flanking and even interdictory fire surveying certain points where the enemy has to pass, and firing on them unexpectedly.

Infantry fire must be opened at the shortest possible distance and with maximum violence, not only to obtain results but also to avoid revealing one's deployment till the last possible moment. Normally, the artillery takes up positions along the routes of communication or very close to them. This requires camouflaging, not only of the positions themselves but also of communication routes, for it must not be forgotten that a change of position will be very difficult in many cases and in every case it will be slow.

Retreat is normally easier to conduct in the mountains, because it is easier to keep units out of sight of the enemy and out of his field of fire and also because positions may be found which permit stubborn resistance by the covering force. The covering force must conduct itself in such a manner, if possible, that the enemy will not be aware of the retreat of the main body or of the direction they have taken, and will attempt to remain in their positions till the main body is so far away that it cannot be overtaken by the enemy. This protection must not be extended solely in the direction of march, but also on the flanks, since the enemy may make use of his fast units to fight around the cover force.

Employment of Large Armored Units in Street Fighting

Translated and digested at the Command and General Staff School from a Russian article by Major N. Noskov in "Krasnaia Zvezda" (Red Star) 8 September 1945.

IT is generally accepted that in fighting for a city, tank units should be employed for encircling and blockading the enemy, for in narrow city streets, tanks lose their mobility and maneuverability to a great extent, and their fire power can not be used to the best advantage. Nevertheless, one of our large tank units entered Berlin and engaged in city fighting. Thus, for the first time in the history of tank warfare, a large mechanized force was engaged in street fighting within a city.

The defenses of Berlin consisted of three belts and a number of intermediate strongpoints. The outer ring of defense ran along the line of canals and lakes, the belt of Greater Berlin passed through the outskirts, suburbs, and Teltow Canal on the south, while the inner ring was based on the Circular Railway of the city.

The penetration by our tank units of the southern approaches surprised the enemy, who had concentrated his forces in the eastern part of the city. As a result, the garrison of Berlin was cut off from the German armies operating to the south of the city.

After breaking through the outer ring of enemy defenses, the tanks swiftly advanced toward Berlin. Using every available road, they bypassed centers of resistance, and quickly overran the outskirts of Berlin. The swiftness and suddenness of this maneuver helped to accomplish the first mission—to approach the suburbs of the city. The middle ring of defenses, along the suburbs and Teltow Canal, was approached by our troops on a broad front (about 12 kilometers). Their first attempt to cross the canal failed (the canal is about four meters deep and from forty to fifty meters wide). All the bridges had been either blown up or prepared for demolition by the enemy. The northern bank of the canal had been heavily fortified. Within the next twenty-four hours, additional reconnaissance was carried out, the artillery was brought forward, and cooperation among the units was organized.

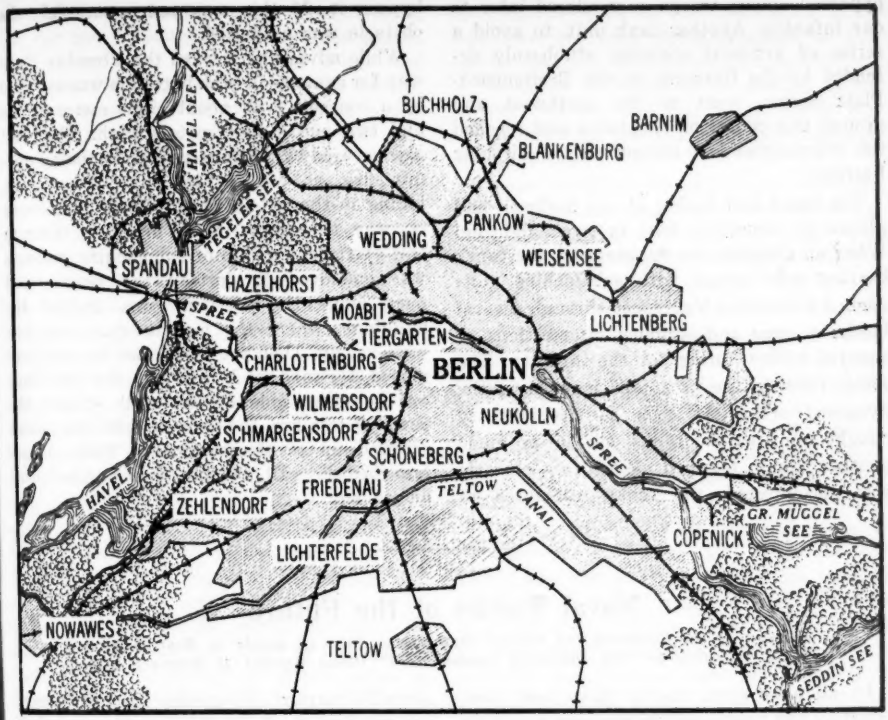
As a result of an effective and well organized artillery and aerial preparation the motorized infantry crossed the canal and seized two bridgeheads on the northern bank. Under the cover of these troops, ponton bridges were constructed, and the tanks crossed over.

Having broken into the outskirts of the city, the tank units were deployed on a broad front. Orchards, gardens, squares, and athletic fields enabled the tanks to do some maneuvering. They could bypass or surround separate centers of resistance, outflank the defensive fortifications, and in some cases bypass them. The enemy resistance in the bypassed areas was greatly reduced.

The character of street fighting in the center of the city differed considerably from that in the suburbs. The continuous mass of city blocks greatly reduced the maneuverability of tanks. Movement was possible only along the street. Some maneuvering was still possible, however. Even well barricaded streets and separate fortified buildings could be bypassed through other streets which were not well prepared for defense. The tanks now had to be reinforced by additional infantry and artillery. The infantry was needed for clearing the buildings of *panzerfaust* men, who were hiding in the cellars or on the ground floors of the buildings. This enabled the tanks to move forward.

Special assault teams, consisting of one tank battalion, one infantry battalion, a company or a platoon of sappers, a battalion of artillery (122-mm or larger), and a platoon of flame throwers, have justified themselves in the street fighting in Berlin. These teams, having well protected flanks, could advance and maneuver within two or three blocks. The general tactics of the assault teams in the battle of Berlin was as follows.

When the team encounters an obstacle, it



either bypasses it or has it blown up by the sappers under the cover of tanks and infantry. Simultaneously, the artillery destroys the buildings beyond the obstacle, blinding and neutralizing the defenders, while the flame throwers set fire to the buildings. When the obstacle is eliminated, the tanks rush through the gaps, and try to penetrate the areas defended by the enemy. The infantry, in the meantime, mops up the area. Tanks and self-propelled artillery are used to secure the flanks along all side streets. This method had numerous variations in the course of the battle for Berlin.

A tank battalion can advance along two or three streets, although this depends upon the number of attached infantry and other troops, as well as upon the stubbornness of enemy resistance and his fortifications. It is best to advance along three streets, with the reserve in the center street. Following a successful advance along one of the streets, the attackers are enabled to maneuver and to bypass the strongly defended areas. As a rule, the advance of a tank battalion along several strongly defended streets at the same time results in the scattering of troops and in a slower tempo of the attack.

Usually, a tank brigade was assigned a zone of attack covering from four to six blocks, and the commander had his reserve in the area of main effort. The presence of this reserve had special importance, for the maneuver of bypassing, which was widely used by Soviet tankmen, increased the tempo of advance and was generally successful.

Thus when stiff resistance was encountered in a sector northwest of Sudensce, our tanks bypassed the area, somewhat to the west of it, without slowing down the advance. The

bypassed enemy troops surrendered later to our infantry. Another tank unit, to avoid a series of artificial obstacles stubbornly defended by the Germans in the Breitenbach-Platz sector, went to the northwest and around this center of resistance and reached the Schmargdendorf station on the Circular Railway.

The speed and daring of our tankmen had played an important part in street fighting. When an obstacle was encountered, the tanks bearing men armed with submachine guns dashed forward at high speed through several blocks at once and occupied intersections or squares while waiting for the infantry. The latter followed the tanks and mopped up the bypassed areas. As soon as the infantry caught up with the tanks, the latter made another jump forward. When an obstacle was encountered, the tanks attempted to bypass it. If this was not successful, the obstacle was assaulted.

While advancing toward the Circular Railway for example, a tank battalion was stopped by a concrete wall about eight meters wide and two and a half meters high. The wall was covered by machine-gun and submachine-gun fire, as well as by *panzerfaust* men, hiding in the adjoining buildings. There was no way to bypass it. In breaking through this obstacle, a group of submachine gunners was employed to destroy the *panzerfaust* men, while the 122-mm guns shelled the buildings, where the machine-gun positions were set up. Then the tanks and the artillery moved forward and fired on the buildings on the other side of the wall. Under the cover of this fire, the sappers with explosives crawled up to the barricade. Three blasts breached the wall, and the tanks and infantry moved on.

Naval Tactics of the Future

Digested at the Command and General Staff School from an article by Rear Admiral H. G. Thursfield in "The Illustrated London News" (Great Britain) 23 February 1946.

IN all ages naval tactics have been governed by the nature of the weapons available at the time to the fighting seaman, and the leading characteristics of warships have varied from age to age with the change in the means available to him of propulsion of his ships or of striking at his enemy. Today the world seems to be in the process of further fundamental developments. There would seem to be some possibility, to say the least of it, of the development of atomic power making possible in the near future a change in the means of propulsion as momentous as that from sail to steam; and we are already in the middle of a process of fundamental change in the weapons available to navies. This latter process is already having the effect on current naval tactical ideas. The Secretary of the Navy of the United States states in his report that the battleship is now no longer the "spearhead" of the American Fleet; it has been replaced as such by the aircraft carrier. No similar pronouncement has yet been made in this country on behalf of the Admiralty, though it seems probable that when the Navy Estimates are presented to Parliament the First Lord's covering statement will contain some exposition of Admiralty views on these momentous questions. These views are not likely to differ fundamentally from American theories and conclusions, for the collaboration between the two navies had been close and cordial during the last four years or more in every ocean. There may, of course, be minor differences, both of practice and of theory; but it seems unlikely that there will be any broad divergence of view. For the time being, therefore, we may take the American pronouncement as expressing the tactical principles that are generally accepted in the naval sphere today.

The Allied Occupation Forces in Japan would today be as helpless as was the gar-

rison of Bataan in 1942, wrote Mr. Forrestal, but for one fact—that American sea power, having destroyed the Japanese Fleet and Merchant Marine, now controls the Pacific. At the same time, it was not sea power alone that won the Japanese war, nor was it air power nor armies. The war in the Pacific was won, and peace is now being preserved, by the combined striking power of all three, each being employed in accordance with the demands of strategy. The function of the Navy, as dictated by those demands, in America's task of winning the war or of preserving peace, is control of the seas and of the skies above them—in the American organization, it will be remembered, there is no Air Force independent of the Army and Navy, but each of those services has its own air component.

It is the control of the seas, of course, that is fundamental—that indeed is the sole aim of sea power. The parallel control of the skies above them is now necessary, not because the air is capable of replacing the sea as a highway and medium of communication, but because an enemy in control of the sky can inhibit the use of the seas below them almost as effectively, if not quite, as one who in the old days was in full command of the seas themselves. It is this consideration that has displaced the battleship from its proud position as the arbiter of sea power—the "spearhead of the Fleet" in modern jargon. When ships were the only enemies to be feared at sea, the most powerful ship of all—the battleship, against which no other could hold out—held pride of place. But today not even a battleship can hold its own against a concentration of air forces unless provided with substantial support in the air, as the British Mediterranean Fleet found to its cost in the later stages of the Greek campaign of 1941. Given that support, however, the battleship of today can play a large part, by means of antiaircraft gunfire, in securing control of the skies above the sea. But the really indispensable factor is the air component of the force that is charged with securing and exercising control of the use of the sea. In a theater of wide-open spaces—such as was the Pacific in the late war—the only effective means of providing that air component, at the time and in the place in which it is needed, is the aircraft carrier; and that is the reason why it has replaced the battleship as "the core of the Fleet."

The aircraft carrier in its turn, however, can no more dispense with the defensive collaboration of other classes of craft than could the battleship in its heyday. The carrier is very vulnerable to gunfire, and cannot herself repel any direct attack by a hostile warship that may succeed in getting within range. If the carrier force of a fleet is large enough, it may be capable, by means of its aircraft alone, of providing full protection for itself against any naval force that might be brought against it. It is not true today, as it was up to 1919 at least, that the only effective antidote to a battleship or squadron of battleships is a more powerful force of the same class of ship. But, up to the end of the late war at least, we had not reached the stage at which complete reliance in all circumstances could be placed on air forces as a match for warships. Darkness or bad weather might incapacitate them, and if it did the aircraft carrier was then just as much in need of the protective collaboration of the battleship as the battleship had been at an earlier stage in need of the protection of a destroyer screen against the submarine. Actually, this latter situation did not arise in the later stages of the American campaign against Japan, though it had arisen earlier on a small scale in the operations in the Solomon Islands. When the American invasion of the Mariana Islands, and later of the Philippines and the Ryukyu Islands, at last stirred the Japanese Fleet to attempt to oppose by sea the American advance, the Japanese Fleet on each occasion was decisively defeated by American carrier-borne air forces and never succeeded in getting into ship range of the American carriers themselves. But if it had happened that conditions had prevented the American air forces from thus operating effectively, then the American battle fleet would have proved its indispensa-

bility in this decisive phase of the campaign just as it had earlier on more than one occasion in the Solomons. The further development of the air weapon may in the future render it effective more continuously and with greater certainty than it has been up to now, and in that case the need for the battleship will grow progressively less; but it cannot be maintained that that stage has yet been reached.

With the virtual elimination of the Japanese Fleet the American battleships were reduced to the role of antiaircraft ships contributing to the defense of the carriers as the American Fleet advanced within the operating range of Japanese land-based air forces; though they also operated from time to time direct against Japanese fortifications or other military objectives on land. They were not the only ships to be employed on that duty, however, for it was shared by the cruisers and destroyers that made up the rest of the fleet. These latter operations may perhaps be regarded as the beginning of the ultimate amphibious stage of the campaign against Japan which was already in preparation by the time of her surrender. They were merely incidental at the time that they were carried out, being made possible by the fact that the American forces had reached positions so close to the Japanese mainland that they could be undertaken without prejudice to the chief task then in hand, the air attack by carrier-borne forces on the selected targets in Japan itself as a preparation for the final subjugation by amphibious attack.

The final pattern of the organization of a fighting fleet evolved in the course of the victorious American campaign across the Pacific against Japan was thus a carrier squadron, which embodied practically all the offensive power of the Fleet, supported by a squadron of battleships, acting chiefly in the role of antiaircraft ships, and by a much larger and more ubiquitous force of cruisers, destroyers, and other smaller craft down to minesweepers, required for the multifarious duties that crop up in the course of a full-scale maritime campaign. Whether the battleship as we know it will turn out to be the most effective form of antiaircraft ship for the conduct of naval operations of this pattern remains to be seen. But it is interesting to trace the development of tactical ideas, in the British Navy, which have governed the employment of aircraft carriers in the past thirty years, a period which has seen both their inception and their rise to the position of chief importance in the fleet.

The Grand Fleet of 1914-18 comprised no aircraft carriers which could receive aircraft on board at sea as well as fly them off, until a few weeks before the armistice, when the first flush-deck carrier, HMS *Argus*, of no more than 14,000 tons, was first commissioned. There was therefore no war experience to guide the Navy, in the period between the wars, in evolving methods of employing carriers to the best advantage as units of a fleet—though that lack was perhaps of no great disadvantage, since the subsequent developments of the capabilities of the aircraft themselves would very quickly have invalidated methods suitable in 1918. For a great part of the inter-war period, the Navy's tactical ideas seemed to be based on the one important clash between opposing navies of recent years, the Battle of Jutland, and the Fleet's tactical exercises tended to take the form of two opposing battle fleets in more or less parallel action, with all lesser craft so disposed as to hold the ring and leave it to the battle fleets to reach a decision. When an aircraft carrier joined the fleet, her aircraft fell into that pattern and performed for the battle fleet the duties of scouting and fire observation as their chief function, attack on the enemy with torpedoes or bombs, neither of which weapons, as carried by them, being very highly developed or very effective at that stage, being regarded as a quite subsidiary duty. For that purpose, the carrier being very vulnerable to the attack of any warship, she was usually kept well out of the enemy's way on the disengaged side of that doughty champion to which the whole conduct of the battle was entrusted, the battle fleet, in the hope that no enemy ship would succeed in getting tough with her.

The next stage came when the aircraft's own weapons—the torpedo and the bomb directed by dive-bombing—developed powers so enhanced that it was clear that an enemy would make her one of the chief targets not only of his ships but also of his own aircraft, whether ship-borne or land-based. It became necessary to reinforce the carrier's means of defense against attack, instead of relying merely on evasion. Photographs published during the war of operations in the Mediterranean or the Indian Ocean show battleships and cruisers in station in close order on the aircraft carriers comprised in their squadrons, evidently with the object of spreading over them the umbrella provided by the heavy antiaircraft armaments which were then being fitted, and reinforcing the carriers' own antiaircraft fire against enemy aircraft that might succeed in penetrating the screen provided by the carriers' fighter aircraft. Experience thus gained pointed, in turn, to the inadequacy of carriers in small numbers; when the function of helping to provide protection for the battle fleet developed into that of providing the fleet's principal striking power, as well as for its own defense, against the full might of an enemy land-based air force, it became clear that carriers must be multiplied far more than battleships. Later photographs of the American fleets that carried the war to the very coasts of Japan itself show them containing several carriers for each battleship; and the British Pacific Fleet that joined up with Admiral Halsey last year was very similarly composed. The tactics adopted by them in action doubtless reflected this development in composition, so far as it had progressed at the time that victory was achieved.

The weapons used by ships are themselves today undergoing a progress of rapid development, drastic, if not revolutionary. Rockets of various sorts, projected from light, almost flimsy, apparatus, seem to be taking the place of projectiles fired from guns of immense weight demanding the most solid of structures to carry them. What the effect of the appearance of the atomic bomb is going to be on the instruments needed for gaining and exercising control of the sea can hardly yet be foreseen in any detail. The Royal Navy and the United States Navy today possess substantial numbers of powerful battleships which, though originally designed for conditions which seem largely to have passed away, are still well adapted for many of the conditions that have replaced them; and they will survive for the present for that reason. But, tactically, their *raison d'être* has disappeared with the disappearance of the navies of the enemies against whom we have been fighting for six years; and exactly what sort of ships, if any, future developments will evolve in their place, and the tactical principles on which they will operate, it would be rash at the moment to prophesy.

The Primogeniture of Victory

Translated and digested at the Command and General Staff School from an article in Spanish by Colonel Vicente Martínez A. in "Memorial del Ejército de Chile," September-October 1945.

It is human that among the participants in any affair that has a successful outcome, there will always be those who will attribute to themselves the better and the more positive efforts in the attainment of success.

Today—with the termination of World War II, and at a time when disunion and controversy are brewing—people in the victorious nations, their victorious armed forces and those that represent their component elements, instead of celebrating their triumph, achieved by the common efforts in action, keep themselves busy pointing out some particular pledge or allegiance, contending for that which we have termed "the primogeniture of victory."

We read daily in the press, and even in the military publications, concerning the recently terminated war—that this new world conflagration has completely revolutionized

the values of the armed forces. It is said—and unfortunately there are some professional people who think this too—that:

1. 1939-1945 conflict has demonstrated that the armed forces of the future will consist virtually of the Air Forces and the Navy, relegating the Army to a secondary place.

2. The Navy will not be needed at its present size.

3. Hence, the Army has no reason to exist, and may be replaced by an internal police force, which in time of war would assume the "insignificant role" corresponding to that of the ground forces.

It appears that those who hold to these ideas do not remember that:

1. War is not a simple event, with one single distinguishing characteristic. On the contrary, it is a very complicated event, having many diverse aspects.

2. Now and always, every country or coalition of peoples will have to solve war problems in the air, sea, and ground.

3. Such problems are interdependent and have absolutely no separate meaning.

If they did not overlook this, they would arrive at the conclusion that one cannot confront a war with any *one* solution, any *one* force, or any *one* element without joining —harmoniously—all solutions, all forces, and all elements.

We reiterate what we have said previously: aerial, maritime, and ground problems are absolutely interdependent. This interdependence is evident and continuous because:

1. A powerful Air Force requires an overflowing supply of planes and speedy replacements.

2. Their building and repair requires a national industry which uses raw materials delivered over land and sea, and the Navy and the Army take part in this delivery and in the protection required.

3. Neither the Navy nor the Army are in a position to follow their task without the cooperation of the Air Force.

4. The Army contributes to the protection of naval and air bases.

The occasional changes in the degree of importance of the branches of national defense are the results of the events of war. At the beginning of the conflict, air power was of great value, since it could operate at a critical moment, thwarting the mobilization and concentration of enemy forces, striking at the enemy's morale and war potential, and preventing the hostile air force from setting out on similar tasks.

In the struggle for naval communications for which the domination of the sea is indispensable—the Navy performs a vital task.

During each one of these particular operations of any one of the forces, the others carry out their share of activities, consolidating their strength to assist the force which is discharging the chief mission—*thus making possible the realization of the one goal which interests the nation and the true professionals; total victory.* It is obvious that, besides this *occasional* function, there exists another as well—the *relatively permanent* function of each force, which stems from the political, geographic, strategic, and other situations which confront it or through which it passes.

Thus, for example, it would be illogical that a nation whose vulnerability is chiefly from the air and sea should maintain an enormous Army and small Naval and Air Forces. The same would also hold true for another country with prospective threats of land invasion should it increase its Navy disproportionately and give only cursory attention to its Army.

Requirements like those just mentioned, intelligently weighed and compared, must predominate in determining the size and power of each force. Only in this way will the imperative national needs be satisfied.

In the course of World War II there have been evidenced the errors of the doctrine of the "all-out, full authority" for any one of the services. In this conflict, as in former ones, victory was attained by the full cooperation of all forces. The same will be necessary in the future unless it be a case of an unremitting attack of a mighty power against a weak one, in which case the bombardment of thousands of planes or of hundreds of ships would end the resistance of the weaker power.

Artificial Moonlight

Digested at the Command and General Staff School from an article in "The Journal of the Royal Artillery" (Great Britain) January 1946.

LOCAL artificial moonlight, which can be turned on at will, cannot hope to replace the sun; but its possibilities are so great that its uses, and also improvements in its production, are well worth careful study.

In broad outline it gives a commander yet another type of weapon; one which can be used under a variety of conditions and which may well turn the scales when deciding whether success in a certain operation is, or is not, a practical certainty. Besides simplifying movement by night in all its aspects, artificial moonlight may also have to be taken into consideration when planning a large scale operation—an attack with distant objectives which would need continuous assault for at least thirty-six hours; where the advantages of giving the enemy no time to reorganize would outweigh the obvious disadvantage of attacking over country that had not been subject to close reconnaissance by daylight.

Without considering the means by which artificial moonlight may be produced, it is well to examine the advantages which can be claimed for its use.

The subconscious fear of darkness; this factor is seldom mentioned in military textbooks, but it exists to a greater or lesser degree in every human being.

In forward areas, where success depends so much on the action of individual soldiers, the fighting efficiency of troops is better maintained under moonlight conditions.

Partial light, in varying degrees of intensity, over the ground immediately in front of our own forward defended localities, is a great asset. The light is distinctly "one way" and our patrols are able to move across country with a greater range of vision than the enemy. Early warning of enemy movement is received and in this way our own troops establish domination over no-man's-land. There is little advantage to claim for artillery observation posts; nearby landmarks are more easily distinguished, but the only observed fire possible is concentrations close to our own positions.

Sufficient light is produced in forward battalion areas to aid movement, wiring and digging parties and to allow supply trains and reliefs to move under the same conditions as exist on a bright moonlit night.

Forward of the divisional maintenance areas, right up to the battalions in contact, there exists a large number of units and sub-units whose job is to support and supply the troops in the line. This is the area from which the moonlight is supplied and here it is at its brightest: in this area, movement at night is widespread and it is hard to conceive a single instance where the artificial moonlight is anything less than an unqualified success.

The sappers can continue bridge building and construction work if necessary: all artillery fire tasks are made easier and the dumping of gun ammunition becomes child's play.

Movement of vehicles and guns on and off roads, is comparatively easy, and traffic is speeded up with resulting all round increased efficiency.

It is also important to remember that this light, which is used to assist or replace the moon, can be turned on or off at will, and can function under almost any combination of wind, weather and cloud. Anyone who has moved about at night under the glow of searchlights used in a ground role will have been impressed by the benefit obtained (even allowing for the fact that the enemy air action was of negligible proportions); and will have noticed the large areas which can be lit up by comparatively few lights.

Against these powerful advantages we must offset and try to counter the various troubles that have been experienced.

It is impossible to achieve a purely local effect; the light which helps the Blankshires'

fighting patrol may delay the relief observation post party on their own front and may expose the Loamshires' wiring party. This fact must be accepted, and plans made accordingly.

To maintain a steady strength of illumination over a certain area it is necessary to alter the focus of the beams in order to keep pace with the changing cloud conditions which occur during the night. It will often be necessary to alter the number of lights used, and allowance must be made for cooling each individual light. This is not difficult provided that there are spare lights and the bare minimum of communications with which to exercise control.

Interference may be experienced by wireless sets working alongside the light generators: a small technical trouble which can be countered by screening.

If the fullest use is to be made of artificial lighting, then something more than the normal layout of searchlights used in a dual role is required. To get the best results, lights must be sited primarily in a ground role, and there must be plenty of them.

There are three ways of producing the moonlight. Firstly, we can use existing equipment and existing searchlight units.

The second method is the expansion of existing searchlight units so that a sufficiently large proportion can always be employed primarily in a ground role. There are many points in favor of an expansion in this direction; particularly as the extra equipment required can be of the simplest type; in fact the beauty of the lighting lies in its very simplicity: we do not (as yet) require modern defensive fire equipment to get the necessary results.

The only other solution is to admit that the probable need for, and possible use of, this type of illumination warrants the formation of new units; moonlight batteries and troops. If we are to get full value from this artificial lighting, we must accept the difficulties of accommodating, supplying, and maintaining a new arm of the service in forward areas.

At the present moment we are only considering the application of a light, designed to illuminate fast moving aircraft, when used in a static ground role. We are only beginning to get some idea of the infinite possibilities of turning night into day. It will pay us to study the complete galaxy of star shell, rockets, flares and pyrotechnics generally when considering artificial moonlight. If it is found that beams of light reflected from clouds give the best answer, then let us experiment with clouds. If clouds are not always available, why not make them?

Observed fire is the basis of all field artillery support. Must we become blind because the sun has set? Surely we have now reached a stage in the application of science when it should be possible to light up an area of ground several thousand yards beyond our forward troops for a sufficient length of time to enable the gunner to find his target and to take appropriate action.

Control of Counterbattery Fires

Translated and digested at the Command and General Staff School from a Russian article by Colonel Y. Skrobov in "Krasnaia Zvezda" (Red Star) 20 October 1945.

COUNTERBATTERY fire is one of the most important elements of artillery action in the engagements fought in the depth of the hostile position. Its organization demands much attention and study and is generally difficult. When the main line of resistance is breached, reconnaissance elements are compelled to shift from one place to another, sound ranging cannot be employed, the artillery displaces forward, and the time required for artillery surveys is limited. The control of counterbattery is also complicated by organizational defects which are inevitable in combat. Poor organization of reconnaissance is only one

of these defects. When the battle develops into a series of isolated combats, all reconnaissance activities become decentralized and, for this reason, cannot be used to the best advantage.

It is known that instrumental reconnaissance (Sound ranging and location of targets by intersection. Editor), artillery observation aircraft, and observation balloons are not always able to determine by themselves the location of firing batteries. When visibility is limited, for instance, the location of targets by intersection becomes impossible, while sound ranging units continue their work. But when the battlefield contains large concentrations of artillery, sound ranging becomes powerless. Likewise, artillery planes and balloons are useless if not furnished information on the locations of the enemy's artillery positions. Consequently, in the decentralized employment of intelligence means it is not always possible to accomplish all reconnaissance missions at the required time.

Another organizational defect is the practice of assigning counterbattery missions only to army gun brigades. Under such conditions no successful suppression of the enemy artillery is possible. Not infrequently this is further impeded by the lack of personal responsibility for counterbattery fires on the part of the commander of the corps, divisional, and attached artillery.

A thorough study of all these causes has shown that, in engagements fought in the depth of a hostile position, all reconnaissance agencies and control of counterbattery fires must be centralized, and that organic and the attached artillery should be compelled to fire counterbattery missions along with army gun brigades, making these commanders personally responsible for the successful accomplishment of counterbattery missions.

In accordance with this, the handling of counterbattery missions has been somewhat changed. Counterbattery artillery groups have been established in all armies. These groups however, were not relieved from other fire missions, such as shelling hostile reserves, destroying strong defensive fortifications, etc.

The army counterbattery group, as a rule, is made up of gun units of the army artillery, light and medium gun brigades of artillery divisions, and, in some cases, of division artillery groups.

The counterbattery groups formed in this manner have always achieved superiority over the hostile artillery. These groups are usually commanded by deputy commanders of army artillery. Each group is divided into as many subgroups as there are army corps in the main attack zone. This insures the effectiveness of counterbattery fires of the corps, improves the artillery fires of infantry divisions, and places the responsibility for counterbattery upon the commanders of division and corps artillery in their respective zones. The organization of counterbattery groups and of their reconnaissance means, and the control of the groups and their reconnaissance units is the responsibility of the army artillery staff.

Thus, it is the duty of the army artillery staff to (1) determine the composition and deployment of the group, (2) to organize its reconnaissance units, (3) to set up its communication system, (4) to control the activities of reconnaissance units, and (5) to control and coordinate the work of the entire group.

Instrumental reconnaissance units, balloons, and artillery observation planes are organized into reconnaissance groups under the command of the officer of the intelligence section of the army artillery staff. The chief of the reconnaissance group is stationed at the counterbattery group observation post and keeps close contact with the commanders of the component reconnaissance agencies and the artillery units of the counterbattery group.

The operation command section of the reconnaissance group consists of one reconnaissance officer from the army gun brigade, the deputy commander of the army intelligence section, and staff officers of the artillery reconnaissance agencies. Besides directing reconnaissance activities and assigning fire missions, the duty of the operation section is to coordinate the work of different recon-

naissance agencies. The chief of the reconnaissance group and his staff keeps close contact with the counterbattery group commander and his staff, and post on their situation maps the information received from their reconnaissance units and the organic reconnaissance of the attacking troops.

The centralization of reconnaissance elements has resulted in timely assignment of reconnaissance missions, while the responsibility for the accomplishment of these missions has made counterbattery reconnaissance a constant preoccupation of artillery commanders.

The Jap Defenses in Malaya

An article in "The Fighting Forces" (Great Britain) December 1945.

THE British occupation of Singapore has demonstrated the completely hopeless position of the Japanese army in Malaya. On Singapore island there were no beach defenses, no mines, no materials for building obstructions, and only four coastal guns.

British officers who interrogated the Japanese staff and searched its records at the time of the surrender are of the opinion that it was totally unprepared and that it was depending on the fanaticism of the individual soldier to make the expected British assault as expensive in lives as possible.

The Japanese Seventh Area Army, which was responsible for the defense of Malaya, Java, Sumatra, and Borneo, garrisoned Singapore island with approximately 64,000 troops. Of these, 24,000 belonged to the Army, 13,000 to the Air Force, and 27,000—including 11,000 civilian workers—to the Navy. The exact figures are not known because the Japanese Army Command has no figure of its own strength and no idea of the number of men at the disposal of the naval commander or the Air Force.

This lack of interservice cooperation was largely responsible for the state of unpreparedness. For instance, right up to the time of surrender no plan had been drawn up for demolition in the harbor area. The harbor area was in the Army sector, but the Army had apparently passed the responsibility over to the Navy. The Navy refused to take orders from the Army and therefore did nothing. The feeling between the two services ran so high that even after the surrender, when Japanese military and naval staff officers were being interrogated, the naval men stood some distance away from the army officers and refused to speak to them.

A defense plan, the first of its kind, was issued on 1 August 1945. It was mainly passive and gave first priority to the construction of deep air-raid shelters and second priority to tunnels for storing of supplies. Active defense measures were low on the priority list and only two per cent of the total fortifications were completed. The system adopted was the proposed building of fifty-three fortresses in the area round the reservoirs in the center of the island. Not one of the fortresses was planned for Singapore city, indicating that the Japanese expected the civilians to revolt.

In at least one case a fortress area was constructed in and around an internment camp. Prisoners of war were forced to dig defenses while their guards jeered at them and pointed out that when the British attacked, the prisoners would be in the dangerously exposed area.

The Japanese staff proposed that these fortresses should be manned according to the direction from which the attack was made. They completely ignored the possibility that air attack might make it impossible to switch large bodies of troops from one position to another. The colonel in charge of fortifications did not know where the defenses were supposed to be built and left the entire work to junior officers. The result was chaotic. One concrete gun position was so well concealed among palm trees that to create a field of fire they had to cut down about 100 trees

and so make the position obvious from the air. This lack of readiness existed on all levels.

In 1942 one British 15-inch gun escaped destruction. For years the Japanese kept it perfectly oiled with two shells in the hoist. But there was not one gun crew in the entire garrison capable of firing it.

Intelligence was remarkably bad. The senior intelligence officer on the Seventh Area Army had no contact with Twenty-ninth Army Headquarters at Taiping. It is doubtful whether he knew of the existence of intelligence officers in other parts of the command. As to strength or disposition of the British forces, he had faced inaccurate and conflicting views of the probable moves of the Southeast Asia Command.

The first suggestion, and the one staff officers of the Seventh Area Army Headquarters obviously believed to be the most likely, was that Southeast Asia Command would launch a direct attack on Singapore island about the middle of November. They thought that the naval force would include five battleships. There were actually two British battleships in the area.

An assault by a total force of between eight and ten divisions was expected. They said that four out of the ten would be mounted through Borneo. Any contacts between Singapore and Borneo would have made it quite clear that Southeast Asia Command had no forces of this strength available in the Borneo area to take part in the attack. The whole proposal would have required an amount of shipping that was clearly not available to the United Nations.

In preparing its report the Japanese staff had not even worked out whether the tides would be suitable for a landing from the sea at the date suggested. The second suggestion showed just as great a disregard of possibilities; it was that eight or ten British divisions would land somewhere on the Malayan mainland and would appear on the Johore coast opposite Singapore island about the middle of December. They were convinced that the initial landings could not be made until at least a month after the date that had actually been fixed. At the time of surrender they still had no idea of the positions of likely landing points.

The Twenty-ninth Army with little information at hand had drawn up its own appreciation of British intentions. They suggested that small-scale landings would be made at Puket and Sabang in August, that there would be a further landing of six divisions about October or November near Penang and Alor Star. They believed that a further landing would then be made in January in the Port Swettenham and Port Dickson area. With no evidence to support this theory they had placed their troops and supplies in accordance with their own conception of what was going to happen, with the result that the entire Japanese force on the mainland would have been completely out of position if there had been no surrender.

Southeast Asia Command had actually planned to make their landing on 9 September at Port Swettenham and Port Dickson a full four months ahead of Japanese expectations.

The Story of "Button"

Digested at the Command and General Staff School from an article in the "Indian Army Review" March 1946.

MALAYA was the focal point for an amphibious assault planned to take place late in 1945, and India was the obvious "springboard" for the mounting of the attack. The preparation or mounting of this operation was called "Exercise 'BUTTON'."

At the very outset it was realized that any operation to take place within the SEA (Southeast Asia) Command required the coordination of all "Q" services to the utmost degree.

The task of this section was to coordinate:

(a) the move of troops, vehicles and guns to concentration areas behind the ports;

(b) their victualling and preparation of all types of vehicles throughout their stages

of waterproofing, timed in conjunction with the ships and convoys movement;

(c) the issue of special rations and the many and varied stores necessary for a long sea voyage.

Four ports within the boundaries of Southern Army were to be used for hte mounting of the Force, viz., Bombay, Madras, Vizagapatam and Cochin. It was obvious that the bulk of personnel and materials would be dispatched from Bombay and Madras, and to effect the smooth working of these two widely-separated port areas, liaison officers with the rank of Lieutenant Colonel were appointed as the Southern Army representatives on the spot. They were given *carte blanche* to make decisions on behalf of Southern Army, if required, and were in direct telephone contact with "Q/Adm. (Plans)" at Army H.Q.

Many of the troops who were to be employed on the operation had only recently arrived back in India from fighting in Burma. It was realized that over and above the normal issue of special equipment required, wholesale reorganization and re-equipping was vitally necessary to ensure that these troops were able to carry out their allotted tasks efficiently.

The parts played by the various services are dealt with under separate headings. It must be borne in mind that the efforts expended on the Exercise were all in addition to the many other "normal" activities of the Services concerned.

Personnel Services

The greatest part of the work done by the Personnel Branch was in connection with the provision of personnel for administering the various additional installations which had to be set up at short notice to deal with the movement and embarkation of troops.

Ad hoc establishments were worked out and published for groups of transit camps to provide a modified "hotel service" in the concentration areas behind the chief ports, as was done in the United Kingdom before the Normandy operations, and personnel to staff these camps were provided from almost every unit and formation in the Army Area not taking part in the operation.

In addition, existing transit camps at the ports were temporarily expanded to twice their normal capacity, which again involved the provision of personnel.

To deal with the large number of vehicles which had to be waterproofed, Waterproofing Centers were set up, composed of IEME (Indian Electrical and Mechanical Engineers) and administrative personnel, the latter provided from local units. To deal with the tricky task of driving the vehicles when waterproofed on to landing craft, and stowing them in the correct order in the confined space available, teams of drivers picked from British units were sent to the principal ports.

The policing of traffic routes from the formation/concentration areas to the docks was a formidable task, with the slender resources of military police that were available.

Supply and Transportation Services

Exercise BUTTON came at a time when considerable numbers of ALFSEA (Allied Force Southeast Asia) units/formations were being lodged in Southern Army area. The maintenance of this large influx of troops presented a number of problems to the RIASC (Royal Indian Army Service Corps). The shortage of supply units was at its peak, and this combined with the fact that the time of concentration coincided with the period when the production of indigenous fresh supplies was at its lowest ebb put a considerable strain on the RIASC and its resources, particularly in 105 and 108 Com Z Areas where the biggest concentrations were taking place.

The main tasks to be carried out were:

(a) The provision of Supplies and POL (Petrol, Oil and Lubricants) for the maintenance of BUTTON formations in the concentration areas and the distribution of special packs prior to embarkation.

(b) The provision of additional requirements of transport from Army sources for maintenance out in the Army area.

(c) Supply arrangements in connection with the victualling of ships at ports.

To implement the above, extra stocks of supplies were placed in concentration areas at Bombay, Madras, and Cocanada, which covered the period during which troops were concentrating. In the case of Madras area special Field Service dumps had to be opened up, complete with Bakery and Butchery facilities.

Special pack rations were called forward to selected depots under arrangements made by GHQ (General Headquarters), and were distributed to units/formations in the concentration areas.

Owing to the load put on Southern Army, additional stocks of tinned vegetables and potatoes were placed in all areas, and a percentage issued in lieu of fresh supplies.

Large quantities of POL had to be made available at depots for the filling of tanks of operational vehicles immediately prior to waterproofing. In addition, "Jerricans" filled with motor spirit and other grades in containers were provided for all types of vehicles.

Motor transport was generally deficient in the Army area, and the problem was to find sufficient from Army sources without interfering with the general works programs.

Indian Electrical and Mechanical Engineers Services

It is probable that few people are aware of the wide ramifications of the Corps of Indian Electrical and Mechanical Engineers. Its activities cover the repair of tanks, wheeled vehicles, guns, small arms, machine guns; fire-control of guns—including predictors and height and range-finders; radio-location; telecommunications—including wireless, telephones and teleprinters; instruments, watches, earth-moving machinery; in fact, every item of electrical, mechanical and optical equipment used by the Army. All this equipment had to be inspected, and repaired where necessary, by the time the Force concentrated prior to embarkation at the ports.

In addition, there was the recovery of broken-down vehicles and equipment to be seen to, and then a vitally-important job—the waterproofing of thousands of tanks, vehicles, guns, instruments, wireless sets, and trailers. By waterproofing is meant the application of certain water and heat resisting materials applied to those parts of a vehicle or gun which, if allowed to come into contact with water, would result in failure of the engine or serious damage to components due to the corrosive properties of salt water. Waterproofing is necessary to enable a vehicle to be driven under its own power from landing craft to shore. The process is designed to enable an ordinary 3-ton lorry to wade through five feet of water and allow for a wave of one and a half feet in addition. When a landing craft anchors off shore there may be two or three hundred yards of water between it and the shore, and for this reason the waterproofing measures on a vehicle are designed to withstand immersion for a period of at least six minutes.

Many hundreds of officers and men of the IEME were of necessity engaged solely on waterproofing duties. Of course, there were many other members of the Corps whose job it was to inspect tanks, vehicles and all types of equipment to ensure that they were in sound battleworthy condition before waterproofing could be commenced. Often equipment was found to be in an unserviceable state owing to previous hard usage; sometimes it could be restored to fit condition by light repairs in the field, but on other occasions it was necessary to evacuate vehicles and guns to the larger IEME workshops where they could tackle complete overhauls. To complete these repairs on time the workshop staff often had to work long hours with little or no rest. Theirs was not a spectacular job, but one of the many that had to be done if the operation was to succeed.

Then, lastly, there were the Ships Maintenance Parties, consisting solely of REME (Royal Electrical and Mechanical Engineers). The parties were small—four or six men in each—and allotted one to each ship. Their job was to maintain the vehicles and equipment, after loading, in a serviceable condition until the time came for disembarkation. They had to check on the waterproofing measures, the vehicle batteries to ensure that

they were fully charged, the tire pressure and countless other items.

Ordnance Services

Exercise BUTTON raised a difficult Ordnance problem, involving the re-equipping of over 150,000 troops to the latest war standard in an extremely short time. The problem was accentuated by the large area over which these troops were spread and the fact that their exact wants could not be accurately foreseen and could only be ascertained after they had actually arrived in the areas allotted to them. In addition to the actual Ordnance stores which had to be received, sorted, and issued out to these troops, and which ranged from such simple items as socks and boots to latest pattern wireless sets and armaments, an almost complete issue of motor vehicles amounting to many thousands had to be made to them. These vehicles again ranged over many types from the simple load-carrying vehicles to the latest pattern specialist workshop lorries and tanks and amphibious vehicles.

The problem was to ensure that those units which needed stores earliest got them first, as it was impossible to collect all the stores and vehicles required by all the units at the same time. A large number of stores of all kinds had to come from all over India and their movement and progressing from other stations in India to depots in Southern India and thence to the units themselves, also presented a difficult Ordnance problem.

Quartermaster Movements

During the early stages of planning of Exercise BUTTON, Movements were already in full swing, for the bulk of the troops eventually to take part in the operations were returning from fighting in Burma. This necessitated dispatching by special train units to many widely-separated points within the Army area. An instance of this is that during the month of June 1945 approximately 40,000 personnel plus equipment and 1,700 vehicles of all types passed through the port of Madras.

The next immediate problem was the dispatch by special train of the bulk of the personnel on leave. As an example, one Division alone required forty special trains to carry their Indian troops to and from their homes in Northern India.

Then followed the carriage of troops, equipment, and vehicles to training areas for specialized training.

During all this time the Force planning staffs had been at work allocating formations to the ports to fit in with the overall plan for the operation, in accordance with the

port capacities. Gradually troops were then moved to concentration areas behind the ports. Even at this time, many administrative units were still arriving from Burma and Assam. By the first week in August, 1945, most of the troops had been concentrated, and the following figures (approximate) give some idea of the numbers involved in the first convoys alone:

Behind	Personnel	Vehicles
Bombay	45,000	5,000
Madras	27,000	3,000
Visagapatam	7,000	400
Cochin	10,000	——

While all this large-scale movement was under way, the transport of stores, equipment, vehicles, etc., had to be arranged to connect with units so that they could be re-equipped for the forthcoming operations.

In addition to the movement of equipment, there was the loading of stores required immediately by the Force on their arrival. These totalled over 60,000 tons plus more than 20,000 tons of petrol.

The final stage was now reached—the loading of vehicles, equipment and stores, and the embarkation of personnel. To lift the first portion of the Force, nearly 200 ships and major landing craft had been arranged at the various ports. Bombay and Madras together took most of these ships. Embarkation Commandants at the ports now took control, calling forward their requirements from concentration areas behind the ports in accordance with the shipping convoy and Navy program.

Conclusion

From the foregoing description of the part played by the Many Services in Exercise BUTTON, it will be realized that the problems were many and various, and necessitated sustained effort to maintain and give the fighting troops the best possible send-off. All this effort had to be expended over and above general routine work.

"Q/ADM (Plans)" section had to assist as general information bureau to all the Services, Areas, etc., as well as general coordination and dovetailing-in of all problems.

Airborne Operations

An article by Major General E. L. Bols, Commanding General, 6th Airborne Division, in a British publication.

IN the closing stages of the war the Americans and ourselves were the only armies using airborne formations. Before the war the Russians had several divisions of parachute troops. The Germans followed suit. We thought about it but got no further. When war came the Russians did not find much use for them in their particular theater. The Germans used them with good effect in the early days, but later found they did not pay. What was the reason? Air superiority—just as you cannot make a seaborne assault unless you first control the sea, so you cannot make successful use of airborne forces without at least local air superiority.

Being airborne is just another way of getting to the battle. We have gone by boat, on foot, by bus, and train. Now we can go by airplane, and it is still the same battle when you get there. The ability to go by air, or make what our American allies call a "vertical assault," has some big advantages over the "horizontal assault." It is easier to keep the enemy guessing where you are going to strike. You can assemble the airborne striking force far enough away to make it difficult for him to find out your intentions, and you can still get quickly into action. The threat of an airborne force in being makes the opponent disperse his reserves, for the blow may come at any time either in his forward areas or deep behind his lines. He also has to use up troops to guard his back areas and vital installations against sabotage and "coup de main" parties which may be dropped at any time.

To exploit these advantages we used two sorts of airborne troops. Special Air Service units provided the sabotage and "coup de main" parties which kept the enemy busy in his back areas. Airborne Divisions were used for the big-scale operations.

These airborne operations, as opposed to SAS [Special Air Service] activities, resolved themselves into two main types, the "deep penetration" and the "quick link up."

"Deep penetration" is where airborne forces are dropped far into enemy territory to secure and hold an area into which airportable formations can be flown. The essence of the plan is to select an area into which you can build up your own forces by air quicker than can the enemy by land or any other means. Incidentally, this type of air operation shows most clearly the distinction between airborne and airportable forces. Airborne forces carry out the verticle assault and hold the "beachhead" in just the same way as the seaborne assault division lands across the beaches and holds a beachhead for the follow-up formations.

The "quick link up" is an operation in which airborne formations are dropped close in front of the land battle and within range of its supporting fire. The object is to disrupt by vertical assault the enemy defenses opposing the ground forces, and so help forward the main assault. The use of airborne forces both in the invasion of northwest Europe and in the Rhine crossing are examples. In both cases the basis of the plan was a quick link up by the ground forces of the main assault with the airborne troops.

It is possible for a plan to fall between these two stools. If airborne troops are put down too far in front of the land battle to make certain of a quick link up and yet not far enough away from the enemy main forces the opposition will soon regain the initiative by use of his reserves and may be able to build them up sufficiently to contain both the airborne forces and the ground forces fighting their way towards them. In fact you have given away the intended direction of the main land thrust.

There is no black magic about airborne. Once on the ground they are ordinary divisions. The only difference is that, in the actual airborne assault, and again the same is true of seaborne assault divisions, certain equipments have to be left behind because they are not easily transportable in craft or are not required in the early stages. Arrangements must be made for this "tail" to catch up as soon as possible and then the division is ready to continue the land battle in the ordinary way.

Every airborne officer and soldier, whatever his rank or arm of the service, needs to be a skilled infantry fighter because that is the sum total of the value of each individual, no more and no less, in the opening moments of an airborne assault. Hence our motto—"Ad Unum Omnes"—All men to one thing.

During the eleven months of the Italian campaign (July 1944 to May 1945), we admitted 10,534 sick, wounded and injured to the Brazilian Hospital Section, which operated in conjunction with American hospitals. Of these we cured 9,137 or 86.7 per cent. Of all the cases hospitalized, only forty-nine died, or 0.4 per cent—a figure comparable to that attained by more experienced and highly developed medical services of other armies, representing the restoration of personnel incapacitated in battle equivalent to about three regiments of infantry. These results are due to the work of our skilled surgeons. We must honestly confess that these results are due to another factor—the lessons learned from the American medical personnel who passed on to us their long experiences in war surgery and medicine and whose marvelous, clear, simple and practical methods, rapidly adopted by our men, are our greatest heritage from the war.

Colonel Emanuel Marques Porto in "Nação Armada," Brazil